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RESILIENCE CAPACITY OF SCHOOL MEAL PROGRAMS IN SOUTHEASTERN U.S. SCHOOL DISTRICTS DURING THE COVID-19 PANDEMIC: FINDINGS FROM MISSISSIPPI, LOUISIANA, AND WEST VIRGINIA

A Dissertation Prospectus
presented in complete fulfillment of requirements
for the degree of Doctor of Philosophy
in the Department of Nutrition and Hospitality Management
The University of Mississippi

By

KRITIKA GUPTA

May 2022

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ABSTRACT

Mississippi (MS), Louisiana (LA), and West Virginia (WV) have some of the nation's highest rates of poverty and health disparities, reflected in high rates of food insecurity. Many of the school districts in these states have greater than 40% of students qualifying for free meals and, under community eligibility, can provide meals free to all children. School meals play an important role in addressing food insecurity in the U.S. and those were severely affected by the COVID-19 pandemic. The ability of social systems (schools) to continue operations during adverse circumstances (pandemic) to ensure the sustained outcome of interest (food security) is called resilience. Hence, the pandemic spurred an urgent need to investigate the resilience capacity of the schools in continuing school meal program operations Resilience frameworks provide the opportunity to assess resilience capacity at different organization levels, but a conceptual model that incorporates the multifaceted nature of resilience and recognizes the structural inequalities in the context of school meal programs has not been utilized. Based on the existing resilience literature, we used a conceptual resilience capacity model to explore the barriers, challenges, and opportunities for improvement among the school food supply chain factors. A mixed-methods research approach was used to identify and assess the barriers and challenges faced by the child nutrition directors (CNDs) in the school districts of the three most food insecure southeastern U.S. states during the COVID-19 school closures. The conceptual model guided the development of focus group discussion questions with CNDs to understand the

adaptive strategies used to ensure equitable meal provisions. We used a combination of deductive and inductive analysis for focus group discussions. We found that the major barriers and challenges faced by CNDs included *food security challenges, workforce challenges,* and *food storage challenges.* The adaptive strategies (strategies adapted to withstand the effect of pandemic) implemented by CNDs were related to *employee and child safety* like safety measures and training, *food distribution* like distribution methods and changes in menu and food preparation and utilizing *workforce changes* like better communication and receiving help from volunteers. The transformative strategies (anticipated long-term changes) implemented were *food distribution strategies, menu changes, using newer equipment,* and *utilizing USDA waivers.* The CNDs also noted encouraging outcomes related to the pandemic like *teamwork* and *recognition of child nutrition programs* as important by the public. The CNDs suggested certain recommendations for the development of future emergency feeding practices and policies, like *communication, documentation, preparedness,* and *enhanced training.*

Based on these findings, a 62-item survey questionnaire was developed to assess the extent of barriers and challenges faced by the CNDs for successful operations of school meal programs in the three states: MS, LA, and WV. A total of 42 CNDs participated in the survey. Major stressor events for school meal programs were reduced participation in school meal programs and reduced availability of meal preparation and distribution supplies. Most CNDs reported improved collaboration among school staff and creativity in menu development and adaptation as main encouraging outcomes of the pandemic. Ready to eat (RTE) foods were the major type of food distributed in school districts as reported by most CNDs. Several CNDs noted

that they ran out of food storage to store more shelf-stable items and had to sign up with third-party distributors to make the food storage, preparation, and distribution process easier. The CNDs also reported that personnel involved in school meal programs had always adhered to the food safety regulations as outlined in the HACCP (hazard analysis and critical control points) but they had to implement additional COVID-19 related food safety efforts to ensure personal and food safety for both children and employees.

A 32-items survey questionnaire was distributed among parents/caregivers to explore disparities and challenges faced in accessing school meals during the pandemic. Ten questions regarding types and modes of food distribution contained same items as listed in the survey distributed to CNDs. Additionally, the survey explored barriers and challenges related to school meal programs during the pandemic. The survey was distributed via Qualtrics and a total of 307 participants completed the survey. Fisher's exact test showed that there was significant association between race and experiencing transportation challenges ($p<0.001$). A significant association was also found between race and experiencing conflicting working hours with meal pick-up times ($p=0.022$). There was a significant association between races and experiencing schools running out of food ($p<0.001$). An independent t-test was conducted to analyze the difference in the perceptions of CNDs and experiences of parents/caregivers regarding school meal programs. We found that the 307 parents (*M* 1.64, *SD* 1.59) experienced receiving significantly lesser RTE foods than what 42 directors reported [t (347) = - 4.86, $p<0.001$]. It was also found that the parents/caregivers (*M* 1.20, *SD* 1.39) experienced receiving significantly lesser take home foods than what directors reported [t (347) = - 1.98, $p<0.049$]. Parents (*M* .81

SD 1.25) reported experiencing picking up meals from non-school sites like food banks more than what directors perceived (*M* .14 *SD* .57) [t (347) = 3.43, p<0.001].

Overall, we were able to obtain information from both directors and parents regarding their experiences, barriers, and challenges in running or receiving school meals during the pandemic. It can be determined that the USDA waivers were a timely policy intervention that enabled school meal programs to be on a resilience pathway and ensured that once the pandemic ceases, the school meal programs can continue running on a better capacity than before the pandemic.

DEDICATION

This dissertation is dedicated to everyone who strive to feed kids every day, the world is better with you!

Dad, thank you for being my first inspiration!

LIST OF ABBREVIATIONS AND SYMBOLS

CDC	Centers for Disease Control and Prevention
CND	Child Nutrition Directors
COVID-19	Coronavirus disease 2019 (pandemic)
CVI	Content Validity Index
FAO	Food and Agricultural Organization
FG	Focus groups
HHFKA	Healthy Hunger Free Kids Act
LA	Louisiana
MS	Mississippi
NSLP	National School Lunch Program
REAL	Resilience Evaluation, Analysis, and Learning
RTE	Ready to Eat
SBP	School Breakfast Program
SFSP	Summer Food Service Program
SSO	Seamless Summer Option
USDA	United States Department of Agriculture
WV	West Virginia

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I do not think that a research project as giant as earning a doctoral degree is a single person's accomplishment. There are numerous people who join your journey directly or indirectly as motivators, as cheerleaders, or as people who do not stop believing in you. I come from a family where education is highly valued. I am a third-generation college student and a second-generation graduate student. I am highly indebted to my parents, Dr. Ravi Kumar Gupta and Mrs. Sapna Gupta, and my brother, Raghav Gupta, who instilled in me the value of higher education. I know that this is one of the greatest days in their lives that they had been waiting forever.

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I believe that my journey at the University of Mississippi has been one of its kind. I graduate with a record of service and accomplishments that allowed me to learn directly from higher administration. I would like to acknowledge Dr. Annette Kluck, Dean of Graduate School and Dr. Robert Doerksen, Associate Dean of Graduate School for everything you have taught me over the past three years. It has been a pleasure working with you!

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CHAPTER I: INTRODUCTION

INTRODUCTION

The COVID-19 pandemic began in the U.S. in early 2020 and brought unprecedented nationwide school closures (CDC, 2020). School closures posed a food insecurity threat for children as over 29 million students rely on free school meals each day (USDA, 2020). The Southeastern U.S. has some of the nation's poorest states and the strong positive associations between food insecurity and poverty have been well-established in previous literature (Feeding America, 2020a; Gaitán-Rossi et al., 2020). Mississippi (MS), Louisiana (LA), and West Virginia (WV) have the highest rates of child food insecurity in the Southeast U.S., which is even more prevalent in minoritized populations (Hernandez et al., 2017; Myers & Painter, 2017).

To address child hunger and child food insecurity in the U.S., federal meal programs like the National School Lunch Program (NSLP), School Breakfast Program (SBP), and the Summer Food Service Program (SFSP) have been established and they serve as the first line of defense against food insecurity in school aged children (Leung & Tester, 2019; Odoms-Young, 2018; Testa & Jackson, 2019). The hardship caused by the COVID-19 pandemic was compounded with pre-existing malnutrition, poverty, food insecurity, and inefficient health services (Akseer et al., 2020; Headey et al., 2020). Since schools play a crucial role in providing nutritious meals, especially to children experiencing food insecurity (Kuhn, 2018), maintaining operations during crises becomes critical. School closures due to the pandemic dramatically decreased meal

operation revenue and the circumstances exacerbated with an increase in the cost of meal preparation, provision, and distribution (School Nutrition Association, 2020).

The COVID-19 pandemic was an unforeseen crisis, spurring research focused on resilience, food insecurity, and school meal programs (Belarmino, Bertmann, Wentworth, Biehl, Neff, et al., 2020; Dunn et al., 2020b; Fleischhacker, 2007; Kinsey et al., 2020; Wolfson & Leung, 2020). From the available literature, it is known that schools continued school meal programs and were able to increase food availability to school-aged children through the COVID-19 child nutrition waivers. However, the unprecedented school closures also brought increased food inequity among marginalized populations, bringing the resilience of schools into question (Morales et al., 2020; Patten et al., 2021; School Nutrition Association, 2020). With the current study, the application of a conceptual model to understand the barriers and challenges faced by the school districts in the implementation of the school meal programs and the racial and ethnic disparities faced by the parents in school meal provision processes is explored.

CHAPTER II: REVIEW OF LITERATURE

School Meal Programs

Administered by the Food and Nutrition Services of the U.S. Department of Agriculture (USDA), school meal programs were designed to ensure food and nutrition assistance to all children nationwide (USDA, 2022). School meal programs in the U.S. include the National School Lunch Program (NSLP), School Breakfast Program (SBP), and the Summer Food Service Program (SFSP). School meal programs are the first line of defense against hunger and ensure food security to school-going children. Literature suggests that the NSLP and the SBP have been successful in reducing food insecurity among young school-going children by making nutritious food more available to them while in school (Ang et al., 2019; Arteaga & Heflin, 2014; Bevans et al., 2011; Crepinsek et al., 2006; Fletcher & Frisvold, 2017).

National School Lunch Program (NSLP)

The NSLP, created under the Richard B. Russel National School Lunch Act (79 P.L. 396, 60 Stat. 230) of 1946, is the largest school nutrition program in the U.S. The Healthy, Hunger-Free Kids Act (HHFKA) of 2010 updated previous school nutrition standards to include more fruits, vegetables, whole grains, low-fat dairy, and lean protein, and limit saturated fat, added sugars, and salt. Implementation of the new nutrition guidelines have ensured foods provided in the NSLP more closely align with the Dietary Guidelines for Americans (Johnson et al., 2016). The meal pattern requirements for SBP include fruits (½ -1 cup), vegetables (1 – 1 ½ cups), grains (1-2 cups), meat or meat alternatives (1-2 cups), and fluid milk (1 cup) depending on age groups. NSLP nutrition standards also limit the amounts of sodium (≤1230-1420 mg), calories

(500-850 kcal), saturated fats (<10% of total calories), and trans fats (zero) depending upon age group. In a study, researchers evaluated the implementation of the new nutrition guidelines and they collected one-week school menu data from the School Nutrition and Meal Cost Study 2014-2015 and School Nutrition Dietary Assessment Study 2009-2010 in order to estimate their Healthy Eating Index scores (Cornish et al., 2016; Gearan & Fox, 2020). They reported that school lunches had near-perfect scores for fruits, whole grains, and dairy. Those children belonging to household with an income of less than 130% of the poverty level are eligible for free lunches under NSLP and those belonging to households with income between 130% - 185% of the federal poverty line are eligible for reduced-price meals under NSLP.

School Breakfast Program (SBP)

The SBP, a permanent entitlement program in 1975, operates in public schools as well as non-profit private schools up to high schools and residential childcare institutions. The SBP supported over 14 million children in 2019 (USDA, 2021d). The program mandates that the participating school districts and independent schools serve breakfast meals that meet the federal nutrition requirements. The meal pattern requirements for SBP include fruits or vegetables (1 cup), whole grain-rich foods (1 cup), meat or meat alternatives (optional), and fluid milk (1 cup). SBP nutrition standards also limit the amounts of sodium (≤540 mg), calories (350-500 kcal), saturated fats (<10% of total calories), and trans fats (zero). Like the NSLP, based on the status of participating in federal assistance programs or based on status as a homeless, migrant, runway or foster-child, children qualify for free or reduced-price breakfast (USDA, 2021d).

The federal government makes it mandatory to offer SBP in elementary and middle schools if NSLP is offered. It has been shown that students participating in NSLP and the SBP can meet 47% of their daily energy needs, 40.6% of the vegetable requirements, 57.7% of fruit

requirement, 51.3% of whole grain requirement, 37.8% of legume requirement, and 77.1% of the milk requirements (Cullen & Chen, 2017). The NSLP and the SBP cannot meet the dietary guidelines individually but together these nutrition programs are important contributors to a student's nutritional status. However, the participation among middle school and high-school students in SBP is significantly less than that of NSLP because of limited school staff support in implementation of SBP and stigma associated with SBP eligibility (Lambert et al., 2007; Lopez-Neyman & Warren, 2016). The NSLP and SBP are provided during the academic school year leaving a gap in meal service during the summer months. This gap is especially detrimental to those students who rely on free and reduced-price meals. Research shows that there is increased food insecurity among children and teens during summer suggesting the increase in food insecurity when schools are not in session (Huang et al., 2016; Turner et al., 2019).

Summer Food Service Program (SFSP)

The SFSP or the summer meals program is administered by the states and provide free meals and snack to school going children under 18 years of age in summer season in low-income areas. SFSP provides breakfast, lunch, and after-school snacks and the meals are served at school sites as well as non-school sites like churches, parks, health clinics, community centers, and apartment complexes. The major drawback of related to NSLP and SBP is that the meals are not available to the students during the summer break. While 26 million children depend on school meals every day, less than 3 million of these children can take advantage of the SFSP because of limited number of sites that serve SFSP (FRAC, 2019). Studies have suggested to expand the accessibility of NSLP during summer by increasing the number of sites and the number of meals at those sites to bridge the hunger gap (Huang & Barnidge, 2016; Miller, 2016). Many school meal programs primarily provide meals for children when school is in session, and not as often

during summer breaks. Thus, the rate of ‘low food security’ increases during summer (Bartfeld & Dunifon, 2006; Collins et al., 2018; Huang et al., 2016; Huang & Barnidge, 2016).

Seamless Summer Option (SSO)

Seamless Summer Option (SSO) was introduced to continue lunch, breakfast, and snack meal patterns through the NSLP and SBP for children in low-income areas. Schools remain eligible for the SFSP but have the option to choose between the SFSP and the SSO. Those children participating in NSLP and SBP are eligible to participate in the SSO through which NSLP and SBP children are automatically eligible for free school meals as long as they are under 18-year-old and meet the low-income criteria. Over time, researchers have suggested the expansion of the Summer Food Service Program (SFSP) and Seamless Summer Options (Bartfeld & Dunifon, 2006; Collins et al., 2018; Huang et al., 2016; Huang & Barnidge, 2016) to include more children by relaxing the eligibilty crtieria.

Impact of the COVID-19 pandemic on school meal programs

The first case of coronavirus disease 2019 (COVID-19) in the U.S. was reported on January 14, 2020 (CDC, 2020) and is also one of the rarest occasions in recent public health history when schools have been shut down for an extended time. The COVID-19 disease spread was announced as a pandemic on March 12, 2020, by the World Health Organization. COVID-19 has brought up several questions for researchers from different domains including medicine, psychology, psychiatry, sociology, education, and food and nutrition science. The White House announced “15 days to slow the spread” on March 15, 2020, followed by social distancing measures. For schools across the nation, this 15-day moratorium on operations turned into a mandatory shut down of schools for the 2019-2020 school year. Thus, stopping meals and removing students' safety net toward reducing food insecurity. Initial government orders suggested to expand seamless summer options, but the supply could never meet the demand, and

hence NSLP was expanded and modified several times making it more flexible for the pandemic. On a global scale, the COVID-19 pandemic brought an increased burden to already existing malnutrition, poverty, food insecurity, and inadequate health and nutrition services (Osendarp et al., 2021; Zemrani et al., 2021).

Actions taken by the USDA

Immediate mitigation strategies implemented during the pandemic were the USDA-issued Child Nutrition COVID-19 waivers which increased flexibility in terms of meal availability, distribution times, and easing of eligibility regulations (Soldavini et al., 2020; USDA, 2021a). The most important component which allowed for uninterrupted supply of food included the USDA's waivers (Table 2.1) like the Mealtimes Waiver, Non-congregate Feeding Waiver, Meal Pattern Waiver, Parent/Guardian Meal Pick-up Waiver, Community Eligibility Provision Waiver, and Waiver of Child Nutrition Monitoring (Schwabish et al., 2020). The issuance of the *Families First Coronavirus Response Act* (Sec. 2022) and the *COVID-19 Child Nutrition Response Act* (Sec. 2202) that authorized USDA to:

- issue a single waiver of child nutrition program requirements to all states under the National School Lunch Program for purposes of providing meals and snacks with appropriate safety measures with respect to COVID-19,
- grant waivers of requirements to allow non-congregate feeding in the Child and Adult Care Food Program for purposes of providing meals and snacks with appropriate safety measures with respect to COVID-19, and
- grant waivers related to the nutritional content of meals served in child nutrition programs if it determines the waiver is necessary to provide meals and snacks and there is a food supply chain disruption due to COVID-19.

Additionally, the USDA supported several changes to the NSLP regulations. These changes included provision emergency supplements, increased NSLP benefits to students, and increased flexibility in participation eligibility. The USDA also allowed flexibility in NSLP's SSO through which the school lunches can be obtained by either grab-and-go meal, home deliveries, or pick-up by parents at specified days and times of the week (USDA, 2021b).

Table 2.1 The USDA waivers that allowed for uninterrupted supply of food to school-aged children till Spring 2021 (relevant to this dissertation study) (USDA, 2021b)

Waiver	Date/ duration	Description	Other information
Mealtimes waivers	Released September 22, 2021; extended through June 2022	To allow schools to serve meals outside of standard mealtimes	
Parent/guardian meal pick up waiver	Released April 20, 2021; extended through June 2022	To allow parents/guardians to pick up meals for their children to eat at home	
Non congregate feeding waiver	Released April 20, 2021; extended through June 2022	To serve meals and snacks through NSLP, SBP, and CACFP in a congregate setting to minimize COVID-19 risk exposure	
Offer versus serve flexibility	Released April 20, 2021; extended through June 2022	To allow access to safe and nutritious meals without compromising personal safety	For senior high schools in NSLP
Child nutrition monitoring waivers	Released March 27, 2021; extended through June 2022	To waive off certain on-site monitoring requirements like the *first week site visits*	
Meal pattern waivers	Released August 27, 2021; extended through June 2022	To allow schools to serve meals even if they do not meet meal pattern requirements	

Impact on school nutrition professionals

During the rapid political and economic adaptation to the COVID-19 quarantine, the U.S. federal government allowed schools to continue serving meals at school and non-school sites even during school closure. Initial steps included continuing pre-existing summer options. The expansion was done at policy level and volunteers were requested because the existing summer

child nutrition programs did not have the capacity to feed over 30 million children who depended on NSLP while schools were in session.

Impact on children and parents/caregivers in the South

Food security among vulnerable populations may often be unstable and has shown to be easily affected by stressor events like conflicts, pandemics, and natural disasters (Constas et al., 2014). The primary contributing factors to worsening health conditions during the pandemic included increase in food insecurity, health care delays, and/or loss of employment. On the other hand, parents who were able to continue their day-jobs had an added challenge of securing food for their children who would depend on school meals during the day (Feeding America, 2020b). The significant factors early in the pandemic contributing to the increased food inaccessibility during the pandemic were job loss, furlough, and reduced income (Niles, Bertmann, Belarmino, et al., 2020). Panic buying of food staples and other supplies were the immediate response of the populations in general to the pandemic that posed food security threat to those populations that could not stock up food during the initial stages of the pandemic (Feeding America, 2020b). Different household level coping strategies during the pandemic were using government assistance programs, using food pantries, and borrowing money from family and friends (Niles, Bertmann, Belarmino, et al., 2020).

The South is the home to nations highest rates of county level food insecurity (84%) (Feeding America, 2020a). Mississippi and Louisiana had the nation's highest 2020 food insecurity projections due to the pandemic (Hake et al., 2020). All the southeastern U.S. states had a high projected rate of over 20% of individuals experiencing food insecurity (Hake et al., 2020). Children in the southeastern U.S. specifically were the most impacted in MS, LA, and WV and were among the nation's top 10 most affected states (Hake et al., 2020).

Mississippi: MS accounts for 23% of all the food insecure children in the U.S. (Feeding America, 2020a). The Jefferson County of Mississippi has the highest rate of food insecurity (30%) and is home to 86% African American population (Feeding America, 2020a). In a previous study, MS child nutrition directors have reported their primary financial concerns to meet the Healthy Hunger-Free Kids Act (HHFKA) nutrition standard requirements, was the decrease in overall revenue, reduced participation in programs, and increased food and labor costs (Meadows, 2020).

Louisiana: The overall child food insecurity rate in LA was 23% in 2019 and East Caroll Parish in LA registered the highest rate of child food insecurity (44%) in the U.S. in 2018 (Feeding America, 2020a). In LA, all public schools were shut down on March 13, 2020. An early education survey conducted on childcare sites in June 2020 reported that childcare providers themselves reported high levels of food insecurity and emphasized the need of financial assistance to run the programs (Bassok et al., 2020).

West Virginia: A 2020 study showed the rate of increase in food insecurity in West Virginia from 16.6% in 2018 to 24.2% by May 2020 (Schanzenbach & Pitts, 2020). As of 2019, the rate of child food insecurity in West Virginia was 19% and over 68,000 children in West Virginia faced hunger (Feeding America, 2022).

Resilience

Resilience is the ability of a social system to endure and adapt to the disturbing events of shocks such that no adverse, long-lasting consequences develop (Berkes & Ross, 2013; Cafer et al., 2019; WFP, 2014). Resilience literature and theories are well developed and applied at large levels like national and global but relatively less explored at local and community level (Berkes & Ross, 2013). Resilience is neither linear nor causal, but rather a multifaceted, complex system

with multiple actors at multiple levels (Béné, 2020; Cafer et al., 2019). A resilient pathway is one where relevant action is taken by the members of the social system to sustain operations during challenging and potentially catastrophic circumstances, such as the COVID-19 pandemic (WFP, 2014). It should be noted that resilience is a dynamic concept that changes with time and the type of event (Cutter et al., 2008). Many stressors accompany an event of shock, for example, the depletion of resources, loss of staff and workforce, and conflicts (Berkes & Ross, 2013). The literature of resilience also explores the strengths of a social system that allows for a collective and strategic response that provides sustained operations. For example, researchers have identified advancements needing to take place because of the adverse circumstances like knowledge networks, technological capacity, infrastructure, and values and beliefs (Berkes & Ross, 2013). These existing strengths and responsive advancements are examples of the adaptive capacity of a community (Cutter et al., 2008; Engle, 2011). A ripple effect phenomenon occurs among the actors of resilience where the impact and the response of one actor essentially impacts and determines the response of the other actors (Béné, 2020). Most of the resilience literature portrays vulnerability or the shock as the major actor of resilience, however resilience is dependent on multiple actors within a social system.

Resilience capacity is composed of (1) absorptive capacity, the capacity to *absorb (persistence)* shock and stress, (2) adaptive capacity, the capacity to *adapt (incremental adjustment)* to shock and stress, and 3) transformative capacity, the capacity to *transform (change)* in the face of shocks and stressors (Constas et al., 2014; TANGO International, 2018a). The analytical model for measuring resilience capacity defines six analytical elements of resilience measurement (Constas et al., 2014). The second element, called the resilience causal framework (Figure 2.1), highlights the boxed components that represent a causal pathway of the

listed set of indicators, mainly determined by the disturbance and the subsequent changes in well-being from the initial state to the post-shock state. The events that affect the normal functioning of the impacted population are called as stressor events (Constas et al., 2014; TANGO International, 2018a). Another similar framework (Figure 2.2) identifies community capacities for collective action community assets, that include community social dimensions, and areas of collective action (Frankenberger et al., 2013).

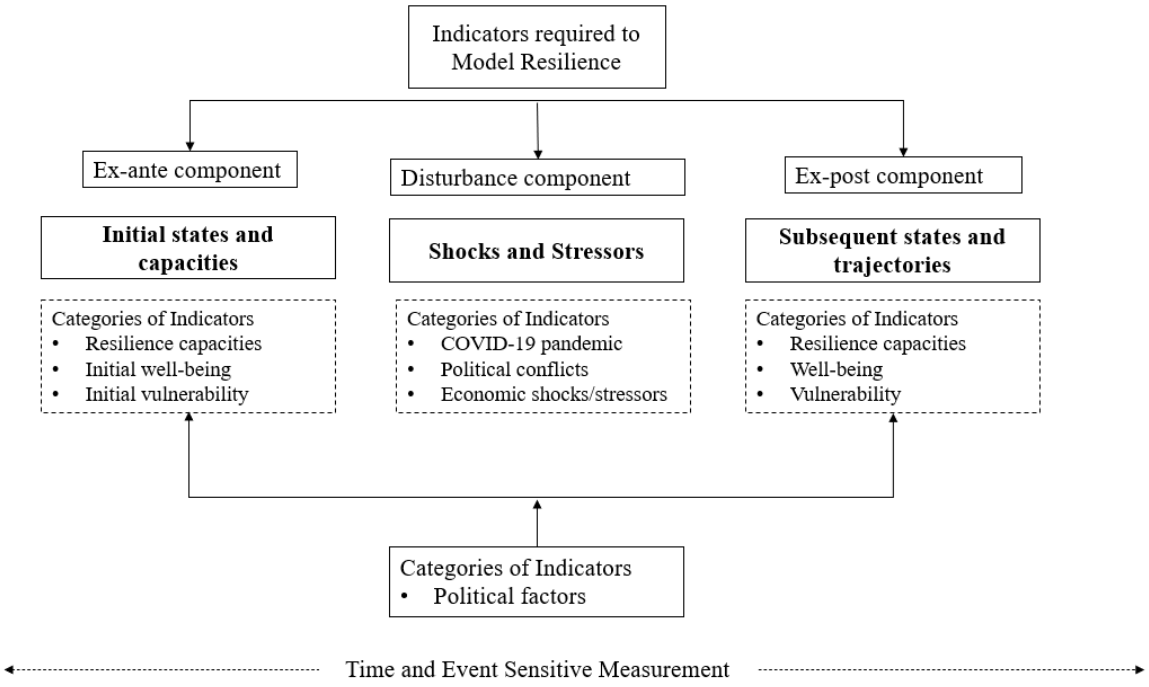

Figure 2.1 Modified resilience causal framework (Constas et al., 2014)

Absorptive capacity is the inherent or existing capacity of a social system. When absorptive capacity is exceeded during the catastrophic events, a social system moves to adaptive capacity to endure and adapt to the event (Cutter et al., 2008). Adaptive capacity is the most influencing capacity in the resilience literature to determine the resilience of a social system, and is the common link between vulnerability and resilience (Cutter et al., 2008; Engle, 2011).

Adaptive capacity is in the context of vulnerability is dependent on (i) the exposure to the shock (i.e. pandemic), (ii) the immediate impact of the shock and stressors on the community, and (iii) the steps undertaken to minimize the impact of the shocks and stressors (Engle, 2011). Improvisation and social learning are important features of adaptive capacity (Cutter et al., 2008). Transformative capacity is facilitated by the adaptive capacity of a community (Engle, 2011).

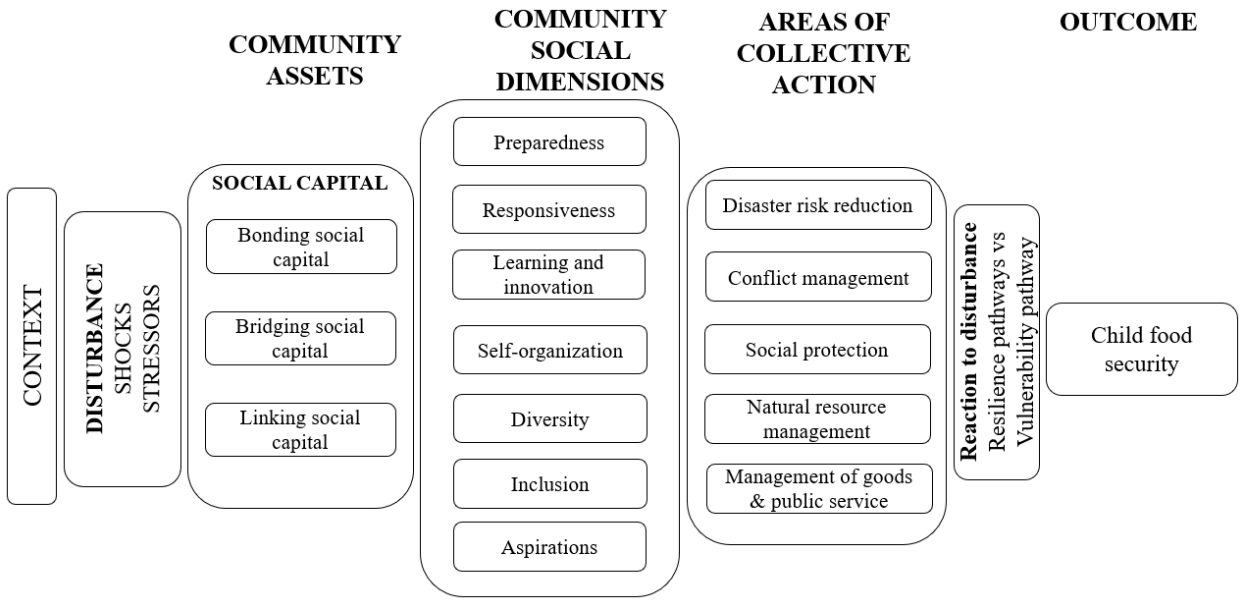

Figure 2.2 Conceptual framework for community resilience (adapted from Frankenberger et al., 2013)

Resilience and school meal programs

Resilience of school meal programs may be defined as the capacity of the school meal programs to meet the food provision demands of all children during unexpected times such as a pandemic. The indicators of resilience are the preventive measures and available coping strategies to persist the shocks and stressors. For a school food supply chain, the important components are procurement, transport and distribution, preparation, and consumption. Thus, an undisrupted food supply chain, training of teachers and staff, and provision of necessary funding for schools and districts indicate a resilient school meal program. Food security is always one of

the most important concerns during emergency situations like pandemics, natural disasters and wars. In previous emergency events like the hurricane Katrina, the USDA expanded the provision of food stamps for all families living under 150% of poverty line against the original 130% of the poverty line to ensure food to affected families (Greenstein, 2005). During the COVID-19 pandemic, school meal programs were one of the leading sectors of national importance impacted by the pandemic. It was also observed that enough food availability may not guarantee adequate food accessibility. With school closures, several factors greatly contributed to students' reduced accessibility to school meals: limited transportation with bus service discontinued, economic obstacles through parents' loss income, and/or no option for an adult to leave work to pick up a school meal for them. Schools form an important community within a community and a vital role in food security through school meal programs (Forrester et al., 2020; Ralston et al., 2017). Yet, to the best of our knowledge, a standard conceptual model to investigate the resilience indicators of school meal programs has not been explored.

In other organizations such as government offices and non-profits, some of the factors contributing to organization-level urban food supply-chain resilience were formal emergency planning, staff training and attendance, insurance, and post-event learning (Hecht et al., 2019). Leadership and participation, management of resources, collaboration, and education and training are the other dimensions of resilience in social systems (Sharifi, 2016). These factors also overlap with absorptive capacity indicators of the school meal programs to ensuring child food security. Resilience is the mediating factor that influences child food security during shocks and stressor events. It becomes essential to plan, develop, and assess strategies aimed at improving the resilience capacity of school meal programs.

Resilient pathway vs vulnerability pathway

When the absorptive capacity of a social system is not exceeded or adaptive strategies like improvisation, social learning, and adequate use of existing resources have occurred, the social system is said to be on a resilient pathway (Constas et al., 2014; Cutter et al., 2008). In the context of this study, this includes the capacity of the school districts to utilize the federal waivers, existing food resources, funding, physical infrastructure, and workforce to continue feeding the school-going children. A resilient pathway ensures that school-going children are fed with minimal or no inequalities and disparities. However, if the opposite has occurred where a social system has failed to efficiently adapt to the shock, leaving the social system vulnerable to further damage, the system can be said to be on a vulnerability pathway (Constas et al., 2014; Cutter et al., 2008; Frankenberger et al., 2013). Resilience capacities determine the adaptive strategies which in turn decide between the resilience and the vulnerability pathway. Whether the pathways were resilient or vulnerable, will influence outcomes of child food security. A theory of change flow-diagram (Figure 2.3) most closely sums up the relationship between resilience and food security (Griffin et al., 2018). The political and economic context of resilience as displayed in mathematical measurement of indices often fail to adequately account for the interconnected nature of a social system (Cafer et al., 2019; Engle, 2011; Hart et al., 2016). In addition to access to basic physical infrastructure, engagement in decision-making process, considerations of cultural inequalities, building equity, and access to information are the additional important resilience features recognized by more recent literature that will be explored in the proposed research (Cafer et al., 2019; Cutter et al., 2008; Hart et al., 2016).

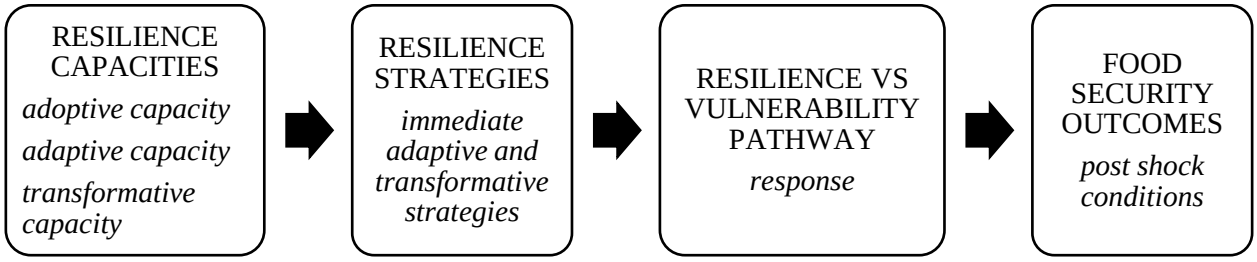

Figure 2.3 Theory of change flow-diagram depicting the relationship between resilience capacities and child food security (adapted from: Griffin et al., 2018)

Another important element of resilience is the psychosocial factors like perceived risk and self-efficacy, that in turn influence subjective resilience and the choice of response to the shock (Béné, 2020). Considering the existing resilience frameworks and the literature surrounding them, this study focuses on the complex relationships, interactions, perceptions, and feedback among the many actors of a social system, here, the governors and the beneficiaries of the school meal programs.

Study Purpose

The aim of the study was to explore the resilience of the school meal programs through an exploratory research design based on resilience framework (Figure 3.1). Resilience framework has been used for different levels of food systems but has not yet been explored in the context of school meal programs. Resilience capacity ensures that stressors and unforeseen impactful events do not have long-lasting adverse consequences (WFP, 2014). Specifically, we explored the adaptive measures used by child nutrition directors (CNDs) through focus groups and surveys. An additional survey was conducted with parents/caregivers to explore their experiences and identify any disparities in food accessibility during the pandemic. The study also allowed for a subjective evaluation of school meal programs' emergency policies. This study will help practitioners and policy makers create approaches to build resilience in the school nutrition programs to continue serving meals to food-insecure children.

Study Objectives

1. To apply a conceptual resilience capacity model (RCM) to investigate the resilience capacity of school meal programs during the COVID-19 pandemic
2. To identify and assess the measures taken by CNDs in MS, LA, and WV for resilient and equitable school meal provision processes during the COVID-19 pandemic
3. To explore the barriers and challenges faced by parents/caregivers in MS, LA, and WV school districts in accessing school meals during the COVID-19 pandemic.
4. To provide insight on key strategies used by CNDs to inform the development of future emergency school meal policies addressing equitable food availability and food accessibility.

CHAPTER III: METHODS

Objectives

The primary aim of this study is to explore the adaptive strategies used by the child nutrition directors (CNDs) during the pandemic, the barriers and challenges faced by them, and the efficacy of those adaptive strategies. A secondary aim is to explore barriers to food accessibility from a parent/caregiver perspective. Results from surveys and focus group analyses provides two perspectives regarding equitable meal access. The over-arching study aim is to inform practitioners and policymakers to mitigate the impact of child food security in times of adverse circumstances like the pandemic.

Population

There were two focus population groups for this dissertation. First, we had CNDs from MS, LA, and WV. Second, we had parents/caregivers of school-aged children of MS, LA, and WV who had utilized school meals during the pandemic. As discussed in the review of literature, the three states were chosen based on the rate of household level food insecurity, rate of child food insecurity, rate of poverty, and rate of hunger (Figure 4.1).

Ethical approval

All research studies in this dissertation were deemed exempt by the University of Mississippi's Institutional Review Board (Appendices A and B).

Data collection

The data was collected using focus group discussions and surveys. Focus groups discussion guide and survey questionnaires were guided by the conceptual resilience capacity

model (RCM) in school meal programs. All data was collected virtually between spring 2021-spring 2022. Focus group discussions were conducted on Zoom. Focus groups recruitment guide, discussion guide, and consent forms are provided in Appendices C-E. Survey responses were collected in Qualtrics (Qualtrics, 2021). Complete survey questionnaires are provided in Appendices F and G.

Barriers and challenges

The CNDs discussed in-depth the barriers and challenges in running school meal programs faced during the pandemic in focus group discussions. Frequency of those barriers and challenges faced by a wider group of CNDs across three states of MS, LA, and WV were assessed through survey. Parents/caregivers provided their input on the barriers and challenges faced by parents/caregivers and their children in accessing and utilizing food.

Food preparation and distribution methods

Both CNDs and parents/caregivers provided their input on food preparation and distribution methods adopted and utilized. In the same subsection, any challenges faced by parents/caregivers in accessing school meals despite the strategically adopted food preparation and distribution methods were also accounted for.

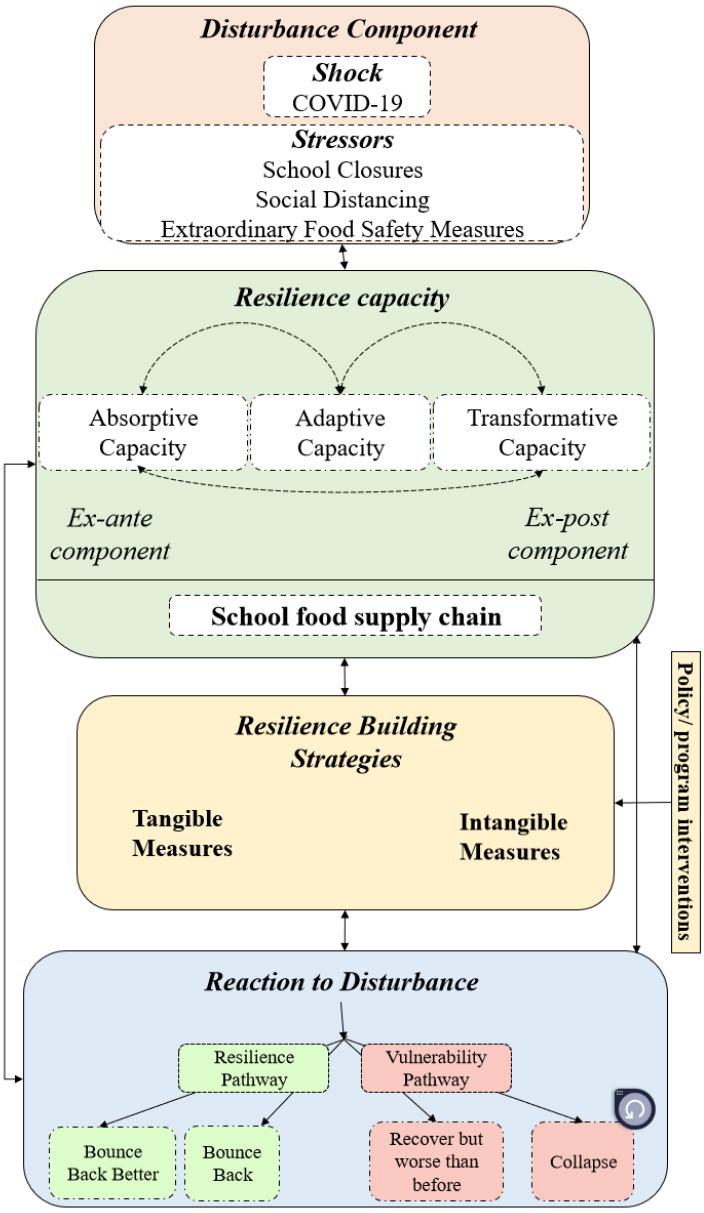

Figure 3.1 Conceptual resilience capacity model to explore resilience of school meal programs (adapted from (Constas et al., 2014; Frankenberger et al., 2013; Griffin et al., 2018; TANGO International, 2018b)

Analysis

We used qualitative data to understand population experiences in their own words and perceptions and quantitative data for to understand frequency of barriers and challenges faced, measures taken, and associations with racial identity. Audio-visual recordings of focus groups were transcribed using transcription function of Zoom (version 5.7.0) and Otter.ai software packages (Otter.ai, 2020). The transcribed files obtained from the Zoom and Otter.ai transcription services were reviewed and cleaned for analysis. A combination of inductive and deductive coding was used for data analysis (Vanover et al., 2021). For surveys, item level content validation index (I-CVI) was calculated for each item (Uggioni & Salay, 2013; Zamanzadeh et al., 2015). Descriptive statistics were performed in SPSS (IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: IBM Corp) and were used to report the barriers and challenges faced by the directors. Microsoft Excel was used to create graphical representation of the data (Microsoft, 2022).

CHAPTER IV

Manuscript I: "SILVER LINING": CHALLENGES AND BEST PRACTICES FOR CHILD NUTRITION DIRECTORS DURING THE COVID-19 PANDEMIC[1]

INTRODUCTION

Administered by the Food and Nutrition Services of the US Department of Agriculture (USDA), the purpose of school meal programs is to ensure food and nutrition assistance to all children nationwide with an aim at reducing child food security (Ang et al., 2019; Arteaga & Heflin, 2014; Fletcher & Frisvold, 2017). In 2020, 11.2 million children in the U.S. experienced child food insecurity (USDA, 2021c). The meals provided at school serve as a safety net in reducing food insecurity. However, the safety net was negatively impacted when the COVID 19 pandemic hit, closing schools and their meal programs nationwide. The COVID-19 pandemic was one of the rarest occasions in recent public health history when schools have been shut down nationwide for an extended time of more than 6 months with at least eight states closing all schools. During the beginning of the pandemic, the mechanism of spread of the COVID-19 virus, biological and physiological impact, and expected duration through which pandemic may

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[1] *This study was funded by the 2022 Graduate Student Council Research Grant G01 and the 2022 achieving Equity Investment Grant. Part of results were presented at the 2022 Annual MS-AND meeting*

last was not very well understood. The resultant stressors of the pandemic and shutdowns included disruption to school meals through hindered school food supply chains, significant and rapid changes in employee and food safety measures, and critical access to nutrition programs, thus compromising child nutrition and food security.

Annually, 4.9 billion lunches and 2.49 billion breakfasts are served to school going children. By late March 2020, the number of missed school meals surpassed 169.4 million and by early May, this number crossed 169.6 million (Kinsey et al., 2020). The number of missed free and reduced-price lunches in Mississippi (MS), Louisiana (LA), and West Virginia (WV) as between March 1, 2020, and May 1, 2020, were 16.6. million, 25.5. million, and 25.9 million respectively (Figure 4.1). Ensuring availability of food to students became increasingly necessary and challenging. Initial mitigation strategies included the expansion of seamless summer options, but the supply could never meet the demand. The National School Lunch Program (NSLP) was further expanded and modified several times, making it more flexible for the pandemic. The flexibilities implemented through the USDA-issued Child Nutrition COVID-19 waivers allowed greater meal availability, increased distribution times, and eased eligibility regulations (Kinsey et al., 2020; Soldavini et al., 2020). To increase distribution of NSLP benefits to students, USDA allowed for relaxation in participation eligibility and flexibility to choose mode of delivering school meals to children. This was a national policy level intervention and waivers were deemed the best mitigation strategies to address child food insecurity. As a result, schools across the US were able to implement certain adaptive and transformative strategies to continue providing school meals. However, certain schools lacked the needed resources and finances to implement those strategies schools at the local level were not adequately equipped or prepared to accommodate those strategies. The ability of any institute to

utilize their existing resources (adoptive capacity) in the event of an emergency (shock) and immediate or long-term adaptation to the needs of the community (adaptive and transformative strategies) tests its resilience capacity. During the pandemic, in organizations such as government offices and non-profits, some of the factors contributing to organization-level urban food supply-chain resilience were formal emergency planning, staff training and attendance, insurance, and post-event learning (Hecht et al., 2019). Leadership and participation, management of resources, collaboration, and education and training are the other dimensions of resilience in social systems (Sharifi, 2016). These factors also overlap with absorptive capacity indicators of the school meal programs.

Resilience of school meal programs may be defined as the capacity of the school meal programs to meet the food provision demands of all children during unexpected times such as a pandemic or other unforeseen calamity referred to as 'shocks'. During public health emergencies like the pandemic, resilience of a school meal program influences the impact of emergency on local food security. Schools form an important resource within a community and a vital role in providing food security through school meal programs (Forrester et al., 2020; Ralston et al., 2017). Thus, for child food security, it becomes essential to plan, develop, and adapt strategies aimed at improving the resilience capacity of the school meal programs. The indicators of resilience are the preventive measures and available coping strategies to persist during the pandemic and obtain successful outcomes.

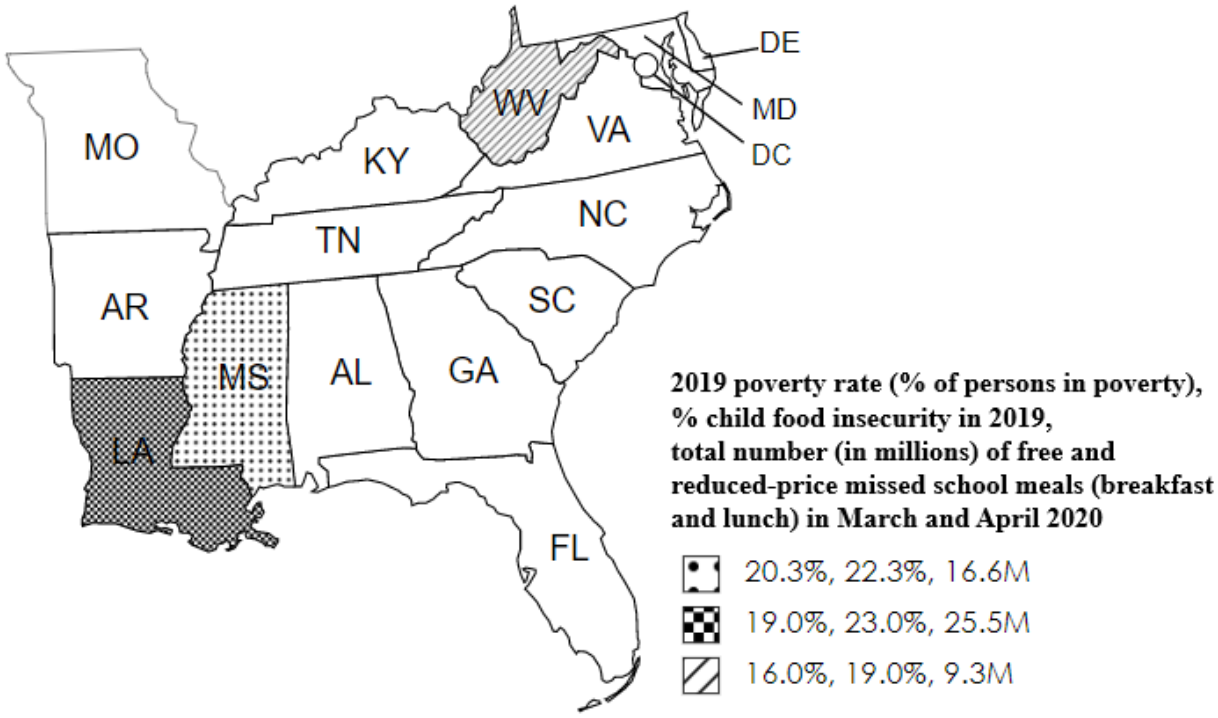


Figure 4.1 Southeastern U.S. map showing with prevalence of poverty (2019), child food insecurity (2019), and total number of missed free- and reduced-price school meals between March 2, 2020, and May 1, 2020

When the absorptive capacity of a social system, like a community, is not exceeded or adaptive measures such as improvisation, social learning, and adequate use of existing resources have occurred, the social system is said to be on a resilient pathway (Constas et al., 2014; Cutter et al., 2008). In the context of resilience, this study investigates the resilience capacity of school districts to utilize federal waivers, existing food resources, funding, physical infrastructure, and workforce to continue feeding the school-going children. Having a resilient pathway ensures that school-going children are fed with minimal or no inequalities and disparities. However, if the opposite has occurred where a social system has failed to efficiently adapt to the shock, leaving the social system vulnerable to further damage, the system can be said to be on a vulnerability pathway (Constas et al., 2014; Cutter et al., 2008; Frankenberger et al., 2013). Resilience capacities determine the adaptive strategies which in turn determine the resilience and

vulnerability pathways. In terms of feeding school-going children, whether pathways are resilient or vulnerable, will influence outcomes of child food security. For school meals, resilience capacity must be met for food supply chains which include, the important components of procurement, transport and distribution, preparation, and consumption. In addition, an undisrupted food supply chain, other components of adaptive capacities for school meals have been found to include training of teachers and staff, and provision of necessary funding for schools and districts to indicate resilient programs with successful outcomes.

This study was guided by the conceptual resilience capacity model for assessing the resilience capacity in school meal programs (TANGO International, 2018c). The specific objective of this study is to explore and summarize strategies adapted, best practices followed, and challenges faced for successful implementation of school meal programs during the COVID-19 pandemic. The aim of the study is to understand the barriers and challenges school closures and school re-openings via focus group discussions with CNDs in the three most food insecure southeastern U.S. states: Mississippi (MS), Louisiana (LA), and West Virginia (WV). Findings from this study will help to understand what strategies were adapted, what best practices followed, and how challenges were faced for successful implementation of school meal programs during the COVID-19 pandemic.

METHODS

Research context, population, and study design

Southern U.S. continues to have some of the highest rates for child food insecurity and health disparities among children (Figure 4.1). Because of the existing economic and health disparities, the child food security in the southern U.S. was also disproportionately impacted by

the adverse impacts of the COVID-19 pandemic. We recruited child nutrition directors (n=16) from MS, LA, and WV.

Ethical approval

The study protocol was exempted by the University of Mississippi Review Board (Protocol: 21x-206) (Appendix A).

Discussion guide

A semi-structured focus group discussion questionnaire (Table 4.1) was developed based on the resilience capacity model (Figure 3.1) to guide the focus group discussions and to foster organic dialogs. A discussion guide was prepared on four main topic areas of a school food supply chain that included procurement, transport and distribution, preparation, and consumption. Additionally, participants were encouraged to describe one best practice they found important for building resilient school meal programs. Content validation of the question guide was completed by two Institute of Child Nutrition staff members and two child nutrition directors in MS. These two directors were exempt from focus group discussions. For face validation, the discussion guide was tested in one focus group discussion and confirmed if it yielded responses relevant to exploring the adaptive strategies used by directors during the pandemic and the corresponding barriers and challenges they faced (Amore et al., 2019).

Table 4.1 Focus groups discussion guide to conduct discussions with child nutrition directors to understand their challenges and mitigation strategies during the COVID-19 pandemic

Questions
1. While we can all agree that the pandemic was horrific, what was one positive outcome you can think that came from the pandemic?
2. As a very broad question, what changes were brought to your menu during the COVID-19 pandemic?

3. How did the COVID-19 pandemic impact the food procurement and storage process?
4. What changes were brought to food preparation process?
5. What changes were made to the food distribution/ provision of meals to the children and what were the challenges?
6. Can each one of you suggest any one best practice that need to be followed in case some similar event happens again?
7. What piece of advice would you want to give to other school districts?

Data collection

Emails were sent to all the child nutrition directors in MS, LA, and WV. Contact information for the directors was obtained from the Departments of Education webpage from each state. Each participant was offered a $50 Amazon gift card for participating. Focus group discussions were held virtually via Zoom on a day and time best suitable for all the participants. Four discussion sessions were held during March – August 2021. All participants completed the written consent forms online and submitted to the researcher via email before participating in the study. Verbal consent was obtained before recording the sessions. Each discussion session was moderated by the primary researcher assisted by two trained note-takers. The sessions lasted for 50-60 minutes.

Data analysis and final codebook development

Audio-visual recordings of focus groups were transcribed using transcription function of Zoom (version 5.7.0) and Otter.ai software packages (Otter.ai, 2020). The transcribed files obtained from the Zoom and Otter.ai transcription services were reviewed and cleaned for analysis. A combination of inductive and deductive coding was used for data analysis (Vanover

et al., 2021). First, the primary researcher developed a codebook based on the conceptual model (Figure 3.1). Deductive coding was employed to categorize the codes into the major themes under the categories. Inductive coding approach was used to further analyze the recordings. Three trained coders including the primary researcher analyzed the raw data. A constant comparative approach was employed by the first author to see if coding of first focus group discussions applied to newer data and created/condensed codes as needed (Bingham et al., 2022; Charmaz, 2014). With each new code identified from additional focus groups, the codebook was expanded and previous coding was reviewed to re-code the previous transcripts (Amore et al., 2019). No additional second level categories appeared in the third focus group, thus reaching saturation at fourth focus group. Further, the primary researcher compared and refined the codes. Since all directors responded to all questions the frequency of subthemes is expressed as a percentage (%) of theme under which that subtheme falls (Tables 4.1, 4.2, 4.4, 4.5, 4.6).

RESULTS

CNDs from 16 school districts in MS, LA, and WV participated in the focus group discussions.

Stressor impacts of the COVID-19 pandemic on school meal programs

Food security challenges

Both food availability and food accessibility were major concerns during the pandemic. Limited food supply, rising costs of food products, and panic buying in general during the pandemic compromised food availability (Table 4.2). There was also reduced availability of food supplies including milk and fresh produce. Even when some of the directors used outside vendors for food distribution, ingredient supply shortage would disrupt meal distribution. The directors mentioned that an increase in cost compromised food accessibility for schools and the

costs spiked for food products, food packaging supplies, food distribution supplies, and food safety equipment.

Workforce challenges

Different challenges were reported by CNDs. First, there was reduced participation in school breakfast and lunch programs. Second, since the pandemic was unprecedented, there were constant and frequent changes in school meal provision process. In providing meals, staff faced several challenges including the need to social distance in kitchens, staff falling sick, and thereby increasing workload on fellow staff members. Third, the CNDs also perceived reduced trust among parents and caregivers of school going children regarding food safety which led to a reduction in participation. CNDs also noted that limited budget and staff being underpaid was perhaps the biggest challenge. As one director quotes, *"You've got to also look at the money too, we're [either] able to keep our employees or we're able to give our employees raises or we're able to get the equipment that we do need"*

Food storage challenges

Since the length of the pandemic was uncertain, directors believed buying in bulk was the best available option. While some of the school districts had sufficient storage, others depended on transporting surplus to another school within the same school district. A few directors mentioned the need to purchase storage equipment like tray sealers, blast chillers, and walk-in refrigerators for proper storage of food products. However, there were challenges in purchasing and receiving equipment for example a director mentioned, *"I mean I can't get equipment that*

were ordered months ago, I have ovens on order, I have a dishwasher on order, I have warmers on order, and parts on order equipment is hard to come by right now"

Table 4.2 Barriers and challenges faced by the child nutrition directors during the COVID-19 pandemic

Theme	Subtheme	Frequency (%)	Exemplifying quote
Food security	Food accessibility	18.75	*"But that higher cost on all those packaging, supplies, ended up costing us a lot also."*
	Food availability	81.25	*"We're having to order milk, two weeks in advance now, because the milk companies manufacturing is down, and the dates aren't lasting as long. We used to be able to order and have milk that would last a week and a half so we wouldn't have to receive milk deliveries during spring break. Well, this year that's not the case because our milk is only lasting, you know, about five days out."*
Workforce	Reduced participation	18.18	*"So, as much as I advertised, as much as I remind them and send out, "hey it everybody free, come get it", there are some parents that don't trust anything outside of their home"*
	Staff challenges	81.82	*"…and to make it easier on our staff, especially if we have multiple people out quarantining, then it's harder to make six entrees, it's easier to prep two [because of reduced number of employees] …"* *"…And I'd say the biggest issue or the, the most labor-intensive issue was cleaning up while children are eating in the classroom, naturally there's going to be spills…"*
Food storage	Storage availability	66.67	*"As far as storage goes, the to go trays are a lot bigger boxes and we, since we weren't feeding in the cafeteria, we were able to use one wall just for to go trays getting those in."*
	Storage equipment	13.33	*"But then on the other hand we had to kind of figure out what to use, because we had limited storage."*
	Menu changes	20.00	*But, you know, we had to get creative with our menus because we had to get some of that stock down because with commodities, we were going to get more commodities whether we use those or not.*

Adaptive strategies implemented by the directors during the pandemic

The changes brought to the currently existing framework of school mail provision process to cope effectively with the impact of the COVID-19 pandemic were categorized as adaptive strategies (Table 4.3).

Employee and child safety adaptive strategies

Directors mentioned several measures taken to ensure employee and child safety during the COVID-19 pandemic. These measures included social distancing, wearing masks, use of personal protective equipment during food preparation and meal distribution, and consistent training received from the state or the federal government. Students' health was given up most priority when deciding about employee and child safety measures. For example, one director says, *"Being that they were eating in the classrooms, I converted some of my dining rooms to prep areas, made sure everybody was six feet apart, redid the work schedule to where we didn't cross paths"*

In the beginning of the pandemic the supply of personal protective equipment was limited. Directors however ensured that they had enough sanitizers face coverings, gloves and hair restraints needed to maintain child, employee, and food safety.

"I mean you had to have a face covering unlike when you walk into a public place now if you have a medical excuse to not wear a face covering you don't have to, but we're in school food serving kids and we really can't have an excuse."

Food distribution strategies

Food distribution was the predominant theme (27.4%) in the focus group discussions. Significant changes were brought to food distribution processes. For example, the child nutrition staff switched from distributing meals in cafeterias to distributing meals in person to students in the classrooms. Meals were available for grab and go, pick up from school sites and non-school sites, as well as deliveries made possible via school buses.

"They didn't want [breakfast in classroom], it was just a pain, they didn't want to count it out. I mean everything about breakfast in the classroom they [school

employees] hate. Well, all of a sudden, we started feeding lunch in the classroom."

The pandemic needed significant changes in the menu to ensure that the food was easy to prepare, had longer shelf life to survive the meal distribution process and packaging, and was prepared in a safe manner. Directors discussed about having to become creative with menus, however, they had limited options to work with based on food availability and food storage.

"As far as food prep, our production was still the same as far as how we prepare the recipes. We actually came up with some new recipes to properly utilize more commodities. Some were actually a hit: slow roasted pork roast, breakfast burrito, with our oven manufacturers we learned how to slow roast overnight... it allowed us to be a little more creative in our menu and our preparation."

Outsourcing meals through third parties was observed for many school districts. Some of the companies mentioned were Revolution Foods, Baylor box program, Meals to You, and Chartwells. The noted negative impact of using third parties was they were more expensive.

"We did use [company name]. The positive was that it was great food. We loved it. The negatives were [that] it was very expensive."

Workforce changes

Out of all the themes related to strategies, *workforce changes* comprised 5.29%. The most effective ways to coordinate and address the workforce challenges work communication (36.36%) and receiving help from volunteers (63.64%).

"When the pandemic hit, not only did they provide food, but they also provided connections, a friendly face (from mask up!). We had several volunteers who

conducted 'porch visits' which used meal boxes as an excuse to come to the home, deliver schoolwork and check on the well-being of our students."

Table 4.3 Adaptive strategies used by child nutrition directors during the COVID-19 pandemic in Mississippi, Louisiana, and West Virginia (n=16)

Theme	Subtheme	Frequency (% of corresponding theme)	Exemplifying quotation
Employee and child safety	Safety measures	66.67	*"They were able to space out in the cafeteria sitting on one side of the table because we had the tables that break apart. But two kids were sitting on one side of the table six feet apart and they were able to actually sit in the cafeteria and eat."* *"Our folks were always masked, always wearing gloves."*
	Training	33.33	*"Training properly so no one gets hurt and switching it up on the fly by also following the safety standards, allowed us to be more versatile."*
Food distribution	Distribution methods	22.81	*"We started feeding lunch in the classroom. So, you know, we hauled lunch down [to the] kids, we call that room service on wheels served with love."* *"...we went to like the Chick-Fil-A model, because that's what it looked like we, we instantly ordered cones and safety gear, and we would not allow anybody in our buildings per se, but we were running car rider lines through our parking lots..."*
	Changes in menu and food preparation	38.60	*"We're still serving things like fresh produce and perishable items like yogurt. Those are easy things that you can package for a grab and go option and then we still have a main hot entree, and we've been able to really use our commodities as well, so they're still scratched, you know, made from scratch items"*
	New resources	21.05	*"...the Baylor box program came out. So, we switched to that and so we ended up moving to a food company that did prepare the boxes frozen and shelf stable, but we only paid for boxes that they distributed, and we did it at four sites so that worked out much better. We continued that throughout the entire school year."*
	USDA waivers	17.54	*"...breakfast and lunch together which was a waiver of the USDA which made operations much easier for parents and guardians... they could simply pick up both meals."*
Workforce changes	Communication	36.36	*"We are "small-town USA" and have always done a great job banding together in times of need; our*

		network was strengthened during this time, and it is how we pulled off the impossible!"
Volunteers	63.64	*"So, all of a sudden, our bus drivers, our maintenance workers, people within the schools came out to help. And it really let me get to know my other departments a whole lot better"*

Transformative strategies

The changes in food preparation, food procurement, food storage, and food distribution processes, that the directors anticipated following even after the pandemic passes were categorized as transformative strategies. Table 4.4 provides a list of transformative strategies adopted by the CNDs with their verbatim quotes. A long-term change that the child nutrition directors plan to implement involves distribution methods (13%). The changes made to accommodate students was received positively with directors and principals alike. Additionally, directors plan to continue offer versus serve, *"because of the decrease in food waste".* Offer versus serve reduces food waste by allowing students to reject some options offer at lunch (FNS, 2012).

> *"And so our contingency plan is we're going to just make the frozen meals [or] that we're just going to have a bag of breakfast things, a bag of fruit, you know, individually cooked for the, the meals, a bag of vegetables, and then a bag of entrees and they'll be frozen and we'll have to have instructions and, you know, heating instructions, but all of our commodity food you know is precooked"*

The food storage and food packaging equipment such as, tray sealers and blast chillers to prepare frozen meals, that were purchased during the pandemic will continue to be used in the future years. The child nutrition directors appreciated the support from the USDA in the form of USDA waivers (10%), which allowed them a lot of flexibility in the way they prepare, procure, and distribute food.

"I just hope that USDA will continue to allow schools to make those decisions and adapt based on what those schools need with, with National School Lunch Program"

Table 4.4 Transformative strategies as anticipated by child nutrition directors

Theme	Exemplifying quote(s)
Food distribution	*"Not only did it let us feed our community and keep everyone employed, but it [also] allowed us to see through the waivers of the USDA issued [including] alternate means to deliver these meals."*
	"I've heard a lot of it from other directors and principals, say that after COVID passes and we get back to normal. If that happens, they want to keep breakfast in the classroom, they want to keep doing breakfast after the bell."
Menu changes	*"So, we did a lot of hamburgers, a lot of chicken sandwiches, things that we could make like that that the kids would be able to eat once we got it to them."*
Equipment	*"As the equipment for the food transporting comes in and Child Nutrition directors are able to store that, those items, and I think we're going to be much better prepared if this ever does occur again for non-congregate feeding, for eating in the classroom, and even our car rider lines that we call them."*
USDA waivers	*"They should be allowed to come and get their meals and take their meals home, where they are comfortable. This will increase our participation"*

Encouraging outcomes

While the pandemic posed several challenges to school meal programs, some encouraging outcomes was noted by the CNDs as given in Table 4.5. Receiving recognition for child nutrition programs was an unanticipated encouraging outcome of the COVID-19 pandemic. At least one director in each focus group session reported how the importance of child nutrition was increased at national level. All participating directors agreed that the school meal program personnel, especially the cafeteria workers were among the front-line workers and essential.

"...but really that silver lining is [that] it kind of elevated our department and showed everyone that you know how important child nutrition is. It's not an afterthought. It's not just a forgotten support service, but that it really is needed by our kids [...] and I'm grateful for it. I think it was, you know, kind of a blessing in disguise in the midst of this crazy pandemic."

Table 4.5 Encouraging outcomes for school nutrition during the COVID-19 pandemic

Theme	Sub-theme	Frequency (% of themes)	Exemplifying quote
Encouraging outcomes	**Teamwork**	50	*"So, while all the teachers and all the principals and everybody else were at home, [those who were] working were our essential cafeteria employees. We ran every single location. All 23 locations ran."* *"We used to be considered the destruction of the day, and now it seemed like it was the, the most vital part of the day, whether it was serving them breakfast and lunch in the classroom because they couldn't social distance in the cafeteria, or if it was packing up these daily meals and going out on the buses to make their daily runs."* *"Like we were able, and I think every county district in the United States Child Nutrition came strong. I mean, we were able to pivot, we were able to get our jobs done."*
	Recognition of child nutrition programs	50	*it kind of elevated our department and showed everyone that, you know, how important Child Nutrition is, it's not an afterthought*

Recommendations

We invested some time to discuss the best practices that CNDs and all personnel involved in school nutrition can follow based on the learning experiences from this pandemic (Table 4.6). Communication (15%) within and outside the district with other CNDs was emphasized, followed by pandemic related preparedness (10%) at school levels to face times of emergencies, attending as much training (18.42%) as possible to remain updated with the current guidelines, and document (15.79%) all processes, and strategies implemented in such an event. The directors noted that it is important to communicate with other school districts to implement changes by regular meetings and discussion. They emphasized the need among different school districts to discuss the strategies that have worked well and those that did not. At the same time, it is necessary that all parents and caregivers receive are aware of the special opportunities during an emergency, for example during COVID-19, provision of free meals for every child regardless of

socio-economic status. Several parents missed receiving meals for the children because they never applied for free lunches.

"We are doing a big push to get everyone to still apply for free and reduced lunch, because we have a lot of angry parents who did not apply for free and reduced lunch because it was free."

There is also a need *"to incorporate a communicable disease or virus standard operating procedures into the HACCP [Hazard analysis and critical control points] plan or into the school safety plan."* School nutrition programs are made to serve children and in the words of one of the directors, *"for child nutrition, it is better to be proactive than reactive."* The emergency preparedness means availability of emergency meals, food storage, necessary equipment, and shelf stable meals. The directors believed that *"officers, directors, along with our school staff need training in emergency management situations".* These trainings can help provide support from the top to the bottom in case of an emergency. These trainings need to be targeted towards enhancement of sanitation, best feeding practices in an ever-changing situation, how to encourage student participation and build parent trust, adapt to constantly new regulations, and other professional development trainings for handling challenging situations.

Table 4.6 Best practices recommended by child nutrition directors during the COVID-19 pandemic in Mississippi, Louisiana, and West Virginia (n=16)

Theme	Frequency (% of theme)	Exemplifying quote(s)
Communication	39.47	*"A child nutrition director that may be new or going through a similar COVID experience is to check your resources and check with USDA- your state department might not know all the answers- you need to expand your horizon beyond the state department and know that USDA is handing down those regulations. Making those networking connections and resources and checking your resources. You have to know the people that are around you and that you need to have your finger around the pole with USDA."* *"…you've got to go to your principal's meetings, you've got to go to your school board meetings, and you've got to voice your needs to them so that everybody can work together and luckily this year,*

		everybody has really stepped up to communicate, work together in ways that they never have before."
Documentation	15.79	*"I think, tracking and documenting and why you made the decisions you did. And then going back and adjusting your plan to what worked, what didn't work and documenting the different things that happened through the process like there were some things that I forecasted, or thought was a great idea and then once it played out is like, yeah, this is not a, this is not working well at all."*
Preparedness	26.32	*"…but I made sure that I supplied them with the trash bags in the hallways. Teachers had trash bags in the classroom. We utilized the janitorial staff as well to make sure that once those meals were eaten that the trash was taken away. And just to make sure that everybody works together."*
Training	18.42	*" I think that officers, directors, along with our school staff need training in emergency management situations. And in essence, I think that the full-service program specifically needed enhancements with the sanitation, with how to feed from one with, within one situation to another one."* *"Never take anything lightly when it comes to sanitation. Train, retrain, and train again."*

DISCUSSION

Barriers and challenges: One of the barriers reported to provide school meals to families reported in our study was that the families did not sign up for free meals, thereby losing the opportunity to access those meals. It has been suggested that automated phone calls and text messages and offering technical assistance to families may ensure that the families are timely updated with the necessary information and their children do not lose access to school meals (Fleischhacker & Campbell, 2020). Although, high poverty schools and districts were eligible for 'Community Eligibility' under which breakfast and lunch could be provided to all children at no cost. Events such as the COVID-19 crisis require both school nutrition professionals and families to establish better communication during public health emergencies (Johnson, 2020). While the directors reported that their major mode of communication was social media, internet access is also a concern, limiting the potential reach from this communication source (Benda et al., 2020). As with most other jobs, school nutrition programs were understaffed due to illness, protecting themselves from the virus, or being furloughed. Additionally, the existing staff had to take on

responsibilities outside their job profiles and/or without additional pay and another study has reported the same (Kuhns & Adams, 2020). Implementation of employee and child safety practices in addition to food safety practices was a challenge in terms of purchasing the necessary equipment because of supply shortage. However, most CNDs noted that the staff has always been following the food safety practices, as is routine, and there were only two additional challenges: using PPE while cooking and staff shortage that led to an increase in workload. These sentiments align with a recent exploratory study reporting that food safety practices during the pandemic were neither easier nor more difficult for the school nutrition staff as compared to pre-pandemic times, however implementing employee safety practices were a significant challenge during the pandemic (Beckstead et al., 2022; Patten et al., 2021). Most of the school nutrition efforts were concentrated on feeding children rather than meeting the federal regulation establishing nutrient guidelines. A major barrier reported to run school meal programs was the financial instability and their inability to be the primary source of food for children. It can be inferred that schools did their best with existing resources to prevent child food insecurity but those may not have met all the nutritional requirements for meals. However, more research is warranted to assess the difference in nutritional security before and during the pandemic.

Adaptive and transformative strategies: There is no single best strategy that worked during the pandemic. The existing infrastructure of the schools were a decisive factor that governed which strategies could work in particular schools. For example, one CND noted that they used their centralized kitchen to cook food for all schools since they were a small school district. Some school districts purchased additional food storage equipment because they had to serve larger number of students. Because of the Families First Coronavirus Response Act, the USDA was able to grant 18 nationwide waivers to expand school meals to every child regardless

of socioeconomic status and at different school and non-school sites (Kinsey et al., 2020). All CNDs in our study also reported the ease of administrative burden as a result of issuance of nationwide USDA waivers. These waivers also helped the school districts to identify innovative strategies and solutions that they would like to implement long term, even when the pandemic passes. One strategy in particular was the needed support to be provided by the USDA to offer universal school meals. A recent study reviewed 47 research studies that explore the potential merits of universal school meals that extend beyond financial benefits for the low-income families. For example, improvement in food security status, increase in classroom attendance, improvement in academic performance, and protective effect against weight gain (Cohen et al., 2021).

In addition to the USDA waivers, different food delivery options have worked during the pandemic. The most appropriate food delivery option varies with school district size, location, and demand for food. All CNDs reported the use of grab-and-go at some point during the pandemic, but further research is needed to see the feasibility of these options especially for disadvantaged parents. Delivering food to a community hub or to homes were other food delivery options implemented by some school districts, but these options pose additional staff workload and rely heavily on volunteers.

None of the participants in our study discussed emergency food provision strategies as used by the *Emergency Food Assistance Program* in the past when school meals have been used for mass feedings, or when all students in the affected area are eligible for free school meals (McLoughlin et al., 2020). These instances point out that either the past emergency food provision processes have either not been documented or communicated properly. Hence, as the CNDs in our study pointed, there is a need for incorporation of emergency school feeding

practices in training as well as a stronger HACCP plan that includes concerns related to disease outbreaks.

Encouraging outcomes: The primary positive outcome that the CNDs discussed was regarding the community's perception of the importance of school meal programs. Additionally, the quick response to the pandemic in the form of immediate announcements for provision of school meals demonstrates a rigorous effort from school nutrition professionals to increase meal participation during public health emergencies (McLoughlin et al., 2020). Child nutrition directors also discussed the innovative strategies they adapted during the pandemic such as (a) changes in staffing models, food preparation and distribution provisions, (b) menu changes to include more shelf-stable items while trying to maintain nutrition standards even when they were relaxed, and (c) employing third-party food distribution companies to allow for easier food distribution.

Revolution Foods and Meals to You were widely used third-party distributors to provide food to children during the pandemic. As of the date of writing this dissertation, Revolution Foods claim to serve 2500 school, city, and customer sites in 564 cities and towns of the U.S. *Meals to You* aims to feed low-income kids in rural areas and is the result of a public-private partnership between the Baylor Collaboration on Hunger and Poverty, USDA, McLane Global, and PepsiCo. By May 2020, Meal to You had already served 3.5 million homes with children in twelve states including MS and LA. Every *Meals to You* box covers breakfast and lunch that can last for two weeks.

Recommendations

Based on the findings of this study, we make five important recommendations for emergency feeding practices:

- Development of a best practices document that has all the necessary documentation in regard to employee and child safety, food safety, and the adaptive strategies that worked for school meal programs during the pandemic. Once the pandemic passes, the impact of this pandemic is believed to remain. In an event that a staff member falls sick with COVID-19 or other contagious disease, it becomes important to follow quarantine and related measures. In such an incident the school staff can refer to the documentation to follow or implement the food preparation and distribution strategies adapted during the pandemic.
- Develop effective communication with all stakeholders of school meal programs such as federal, state and local government as well as communities (Masonbrink & Hurley, 2020). The communication channels should extend beyond using social media, and potentially continuing to use traditional communication modes like newspapers, and information packets to be sent home.
- We strongly recommend the universal free school meals as has been advocated in past by nutrition organizations of national importance such as, the by School Nutrition Association and the Academy of Nutrition and Dietetics (Sanders, 2021; *S.1530 - Universal School Meals Program Act of 2021*, 2021; SNA, 2021).
- In light of the work carried out by school nutrition staff, it is imperative that we recognize the need to have healthy and well supported staff that can remain encouraged to carry out their jobs during public health emergencies.
- Those directors that reporting using third party vendors faced lesser challenges compared to those who did not. Schools without larger kitchens or access to personal safety equipment could use vending or food distributing companies. Another option is to

provide necessary skills, training and equipment to schools to adapt to emergency feeding practices. Both these options need adequate federal and state funding.

Strengths and limitations

The major strengths of this study are that we conducted in-depth discussions to find what made school meal programs resilient in these southern schools. We employed a theoretical model that has not been explored in the context of school nutrition or child food security before that allowed us to use a better lens to screen those strategies that, as the directors emphasized, should remain long-term. As with any research study, this study also has limitations. First, the participation turnout for every focus group discussion session was low (50-60% of the invited), even though we offered incentives for participation. However, we attempted to make sure that all the topics were discussed in-depth. Second, these findings derive from states that have long standing highest rates of poverty, hunger, and food insecurity and these findings may not be generalizable in context of other states with well-established emergency food provision practices, or those that receive greater funding to run their programs. Finally, the findings are not separated by size or location of school districts as a comparison between states was not the aim of the research study

Conclusion and implications for school food service

The findings of this study gleaned from the child nutrition directors can be used to inform the development of future emergency school meal policies. It can be inferred from this study that the school meal programs are better equipped, and the professionals are better trained than before the pandemic and were able to pivot to emergency feeding practices. Yet, there is a dire need for a systematic training for emergency feeding practices, in addition to the need for increased

funding to school meal programs and the need for every school to have the necessary food storage and distribution to increase resiliency of the school meal programs.

CHAPTER V

Manuscript II: CHALLENGES AND BEST PRACTICES IN THE IMPLEMENTATION OF SCHOOL MEAL PROGRAMS FROM DIRECTORS' PERSPECTIVE[2]

INTRODUCTION

When nations went into lockdowns, schools followed suit with their own shutdowns. As the COVID-19 pandemic progressed, opening schools became uncertain. Schools are the primary learning centers for students and schools also cater to other developmental needs including physical activity and nutrition. Everyday over 30 million children in the U.S. depend on school meals for their nutrition (Billings & Aussenberg, 2019). School closures during the pandemic meant those children were losing access to school meals. Thus, the pandemic had a negative compounding impact on national child food security and test the resiliency of school meal programs. School meal programs were among the most impacted government-run food security programs. The immediate government level intervention involved the issuance of U.S. Department of Agriculture (USDA) child nutrition COVID-19 waivers that allowed school nutrition professionals to continue running these programs even during national lockdowns and

[2] *This study was funded by the 2022 Graduate Student Council Research Grant G01 and the 2022 Achieving Equity Investment Grant*

school closures. A majority of public-school students in Mississippi (MS), Louisiana (LA), and West Virginia (WV) rely on government funded school lunch and breakfast programs for their everyday meals (Leib et al., 2020). In 2018, before the pandemic, the child food insecurity rate in MS, LA, and WV were 23%, 24.6% and 20.3% respectively, and these states were among the top 10 child food insecure states in the U.S. (Hake et al., 2020). This meant increased food insecurity burden during the pandemic in the form of reduced food availability and reduced food accessibility. School nutrition staff faced several challenges amidst frequently changing COVID-19 related operational and safety guidelines like staff shortage, unavailability of necessary funding, and equipment. In our previous qualitative study (Chapter III), we used the conceptual resilience capacity model to explore the challenges and best practices for child nutrition directors in MS, LA, and WV. The purpose of this study was to quantify those challenges and best practices. Specific objectives of the study were (1) to develop a survey questionnaire to aid in the investigation of the challenges faced and best practices recommended for resilient school meal programs and (2) to quantify the challenges faced and best practices recommended for resilient school meal programs in MS, LA, and WV.

METHODS

Procedures

This study protocol was exempted by the University of Mississippi Review Board (Protocol: 21x-206) (Appendix B).

Survey development

Step 1: Preliminary item writing: Preliminary question items were developed by three researchers based on focus group findings from Study 1 and guided by the resilience capacity model (Figure 3.1), which was also used for the development of the focus group discussion

guide. Special attention was paid to grammar, language, clarity, and the use of technical terms in the questionnaire. The questionnaire items were reviewed and discussed several times until all three authors agreed to the final set of items.

Step 2: Content validity: The questionnaire was sent to seven subject experts via email that included the aims, objectives, brief description of the study, and the procedures for a final assessment of question items (DiIorio, 2005). These personnel included subject experts in school nutrition and survey development (five with a doctorate degree and two doctoral candidates). All personnel provided a score for content relevancy on a scale of 1 (not relevant) to 4 (very relevant) and clarity on a scale of 1 (not clear) to 4 (very clear) (Zamanzadeh et al., 2015).

Step 3: Face validity: The questionnaire was discussed with the subject experts for their wording, comprehension, and difficulty level. A small conveniently selected sample was used to determine the face validity using participants' and experts' suggestions (Zamanzadeh et al., 2015). The feedback was incorporated into the final questionnaire.

Final questionnaire

The final survey questionnaire was divided into seven modules (Appendix F). The first module contained five questions about some basic information related to the survey participants, like their education and years of experience in child nutrition. The second module contained nine questions (items 6-14) to assess the impact of the pandemic on the operations of their nutrition program. The items were used to quantify the barriers and challenges faced by the directors. These include, but are not limited to, challenges in food access, financial challenges, community support, staff shortage, food packaging, meal kit development, and many more findings from the focus groups discussion analysis. The third module (items 15-20) explored the encouraging outcomes of the pandemic. The fourth module (items 21-30) contained questions that assessed

the strategies for food provision, and distribution. Questions in the fifth module (items 31-36) were related to changes in need for storage and if additional storage was purchased. Module 6 (Items 37-54) contained questions regarding food safety, child safety, and personnel safety measures. The last module included questions regarding changes in staff employment due to the economic impact of the pandemic. Item-wise content validity index (CVI) for all the 62 items is provided in Appendix H.

Survey distribution

The questionnaire was set up in Qualtrics and sent through emails. Child nutrition directors (CNDs) were offered $20 gift cards as an incentive to participate in the survey. CNDs in every school district in MS, LA, and WV (n=305) was contacted via email to participate in this survey. Reminder emails were sent those CNDs who did not respond to emails. Of all the responses received (n=47), five incomplete survey responses were deleted (n=5), yielding a total response rate of 13.77%. The survey participants included 28 from MS, 10 from LA, and 4 from WV.

Data analysis

Item level content validation index (I-CVI) was calculated for each item (Uggioni & Salay, 2013; Zamanzadeh et al., 2015). Descriptive statistics were performed in SPSS (IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: IBM Corp) and were used to report the barriers and challenges faced by the child nutrition directors. Microsoft Excel was used to create graphical representation of the data (Microsoft, 2022).

Results

Demographics

Of all the participants, the official titles of participants were 38 child nutrition or food service directors, 3 child nutrition managers or supervisors and one chief financial director. The distribution of highest degree completed was 15 with an associate or a bachelor's degree, 24 with a master's degree and one with a doctorate degree. Eight participants had child nutrition experience of 3-5 years, 11 had 5-10 years of experience, and 23 participants had over 10 years of child nutrition experience.

Stressor events for school meal programs during the pandemic

From the beginning of the pandemic, school meal program operations were impacted with varying intensities throughout the different school terms. Table 5.1 shows percentage of agreement by CNDs to operational impact statements beginning from the start of the pandemic (spring 2020) and progressing to spring 2021. Many CNDs (83.33%) reported reduction in school meal participation in spring 2020 and was continued for most CNDs (61.90%) into spring 2021. Challenges to meet reimbursable meal requirements was true for increased to 83.33% in spring 2021. Reduced availability of food products, and supplies related to meal preparation and distribution, and challenges to provide planned menus were reported by showed over 40% increase as the pandemic continued. For spring 2021. Although schools have always been required to implemented food safety protocols, the largest percentage of directors agreed that from the beginning of the pandemic there was the need to adhere to additional COVID-19 protocols such as wearing personal protective equipment.

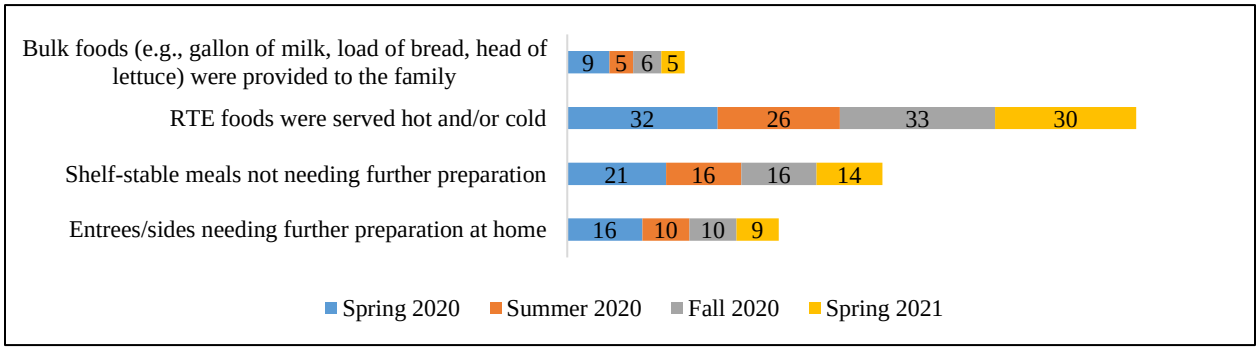
Table 5.1 Child nutrition directors' agreement on COVID-19 impact to school meal program operations

	Spring 2020 (n, %)	Summer 2020 (n, %)	Fall 2020 (n, %)	Spring 2021 (n, %)
Financial losses	32, 76.19	23, 54.76	28, 66.67	22, 52.38
Reduced school meal participation	35, 83.33	27, 64.29	32, 76.19	26, 61.90
Reduced availability of food products	19, 45.24	14, 33.33	30, 71.43	37, 88.10
Reduced availability of supplies related to meal preparation and distribution	21, 50.00	15, 35.71	32, 76.19	40, 95.24
Additional COVID-19 protocols and food safety practices to be established for employees to ensure serving safe food	37, 88.10	31, 73.81	40, 95.24	40, 95.24
Constant changes in guidance regarding COVID-19 related safety	21, 50.00	19, 45.24	21, 50.00	23, 54.76
School meal program staff shortages	27, 64.29	19, 45.24	35, 83.33	37, 88.10
Challenges to providing planned menus because of either staff or shortage or food supply chain shortage	23, 54.76	16, 38.10	32, 76.19	40, 95.24
Challenges to meet reimbursable meal requirements	22, 52.38	19, 45.24	28, 66.67	35, 83.33

n=number of participants, % = percent of total participants

Adaptive strategies

Types of food distributed



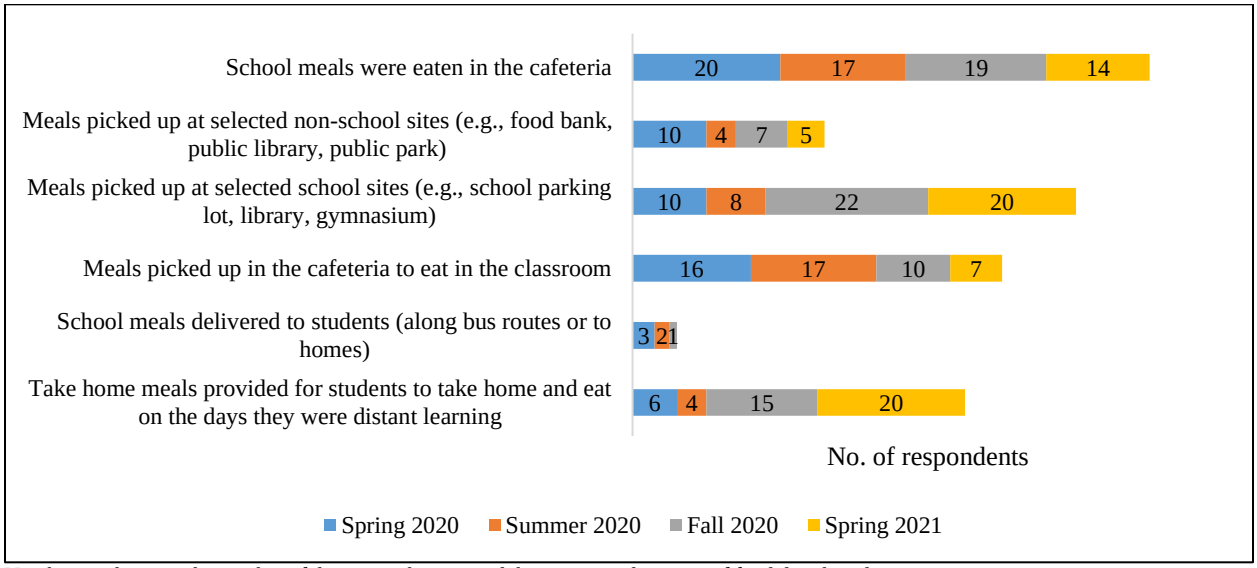
Numbers on bars are the number of directors who reported the corresponding type of food distributed

Figure 5.1 Different types of food distributed during the COVID-19 pandemic as reported by the child nutrition directors

Findings from focus groups yielded the four different types of food distributed. For spring 2020, ready-to-eat (RTE) foods and shelf-stable meals were the two types of food distributed reported by 76.19% and 50% of the participants respectively. For all school terms, RTE foods were reported as the major type of food distributed in school districts by most directors (Figure 5.1).

Meal provision methods

Out of the different meal provision methods used, 20 CNDs reported that school meals were eaten in cafeteria, 16 reported that meals were picked up in cafeteria to eat in classroom in spring 2020, and 22 CNDs reported that school meals were picked up at school sites (Figure 5.2). Only 3 CNDs reported that school meals were delivered to students along bus routes or to homes in spring 2020 and none of the directors in spring 2021.



Numbers on bars are the number of directors who reported the corresponding type of food distributed

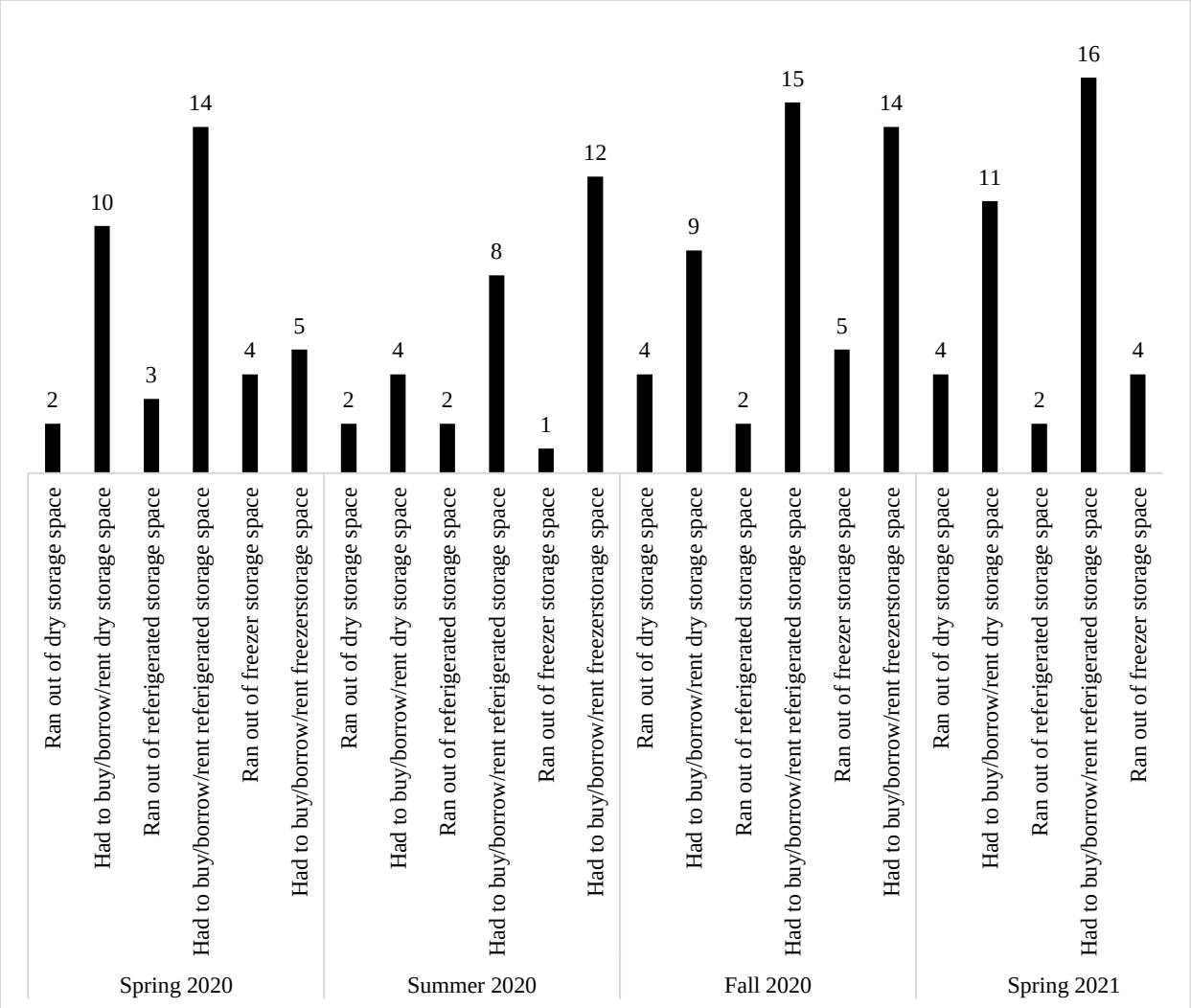
Figure 5.2 Different modes of food distribution used during the COVID-19 pandemic as reported by the child nutrition directors

Storage

In several school districts, CNDs reported that the existing storage capacities were not sufficient to store the additional dry, frozen, and shelf-stable foods needed for the alternative menus. Insufficient storage during spring 2020 was not as prevalent in spring 2021. In our survey several participants reported running out of dry (n=14), refrigerated (n=11), and freezer storage (n=16). For all terms, refrigerator and freezer storage were the greatest needs with dry storage being most adequate (Figure 5.3).

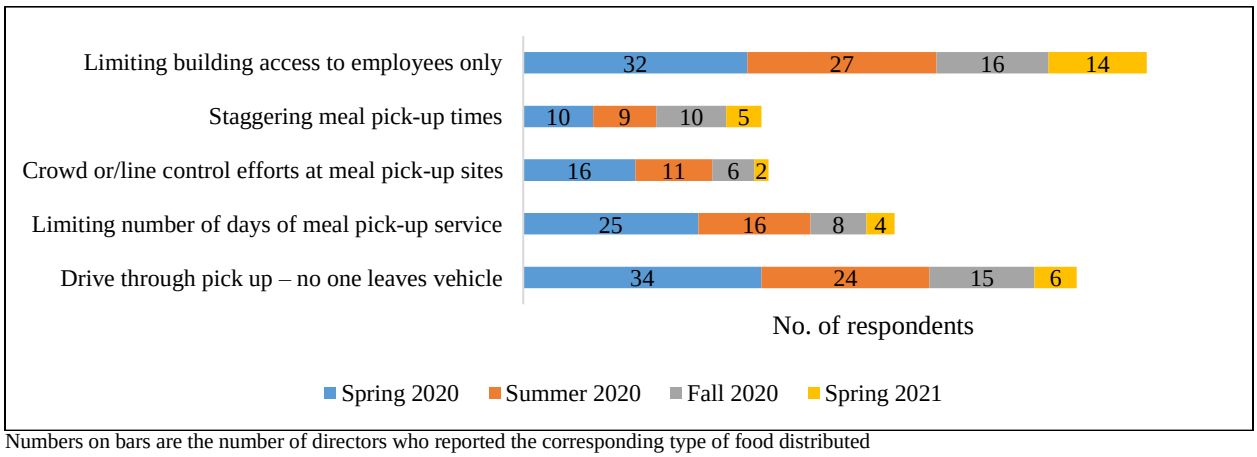
COVID-19 related safety

Drive-through pick-ups, limiting building access, and limiting the number of days for meal pick-ups were reported by most directors for spring 2020 and summer 2020. For spring 2021, limiting building access remained the most reported safety measure (Figure 5.4). In addition, several measures were taken to adhere to the safety precautions for food distribution due to the pandemic safety protocols (Table 5.2). Most CNDs reported use of alternative safety measures were highest during Fall 2020 with most common measures being to include more frequent cleaning and sanitation, implementing mask requirements for both staff and students, frequent handwash, and social distancing inside the schools.



Numbers on bars are the number of directors who reported the corresponding type of food distributed

Figure 5.3 Food storage challenges for child nutrition directors during the pandemic



Numbers on bars are the number of directors who reported the corresponding type of food distributed

Figure 5.4 Employee and child safety efforts taken by child nutrition directors during the pandemic

Table 5.2 COVID-19 related food safety efforts during the pandemic

	Spring 2020 (n, %)	**Summer 2020 (n, %)**	**Fall 2020 (n, %)**	**Spring 2021 (n, %)**
More frequent cleaning/sanitation	35, 83.33	31, 73.81	37, 88.10	35, 83.33
Discontinuing use of self-service stations or bars (i.e., salad/condiment bars)	29, 69.05	20, 47.62	28, 66.67	26, 61.90
Enforcing social distance where meals are consumed (e.g., spacing tables 6 feet apart)	26, 61.90	20, 47.62	35, 83.33	31, 73.81
Providing and/or requiring masks for students	26, 61.90	21, 50.00	38, 90.48	34, 80.95
Requiring students to wash hands/use hand sanitizer prior to meal service	24, 57.14	18, 42.86	35, 83.33	32, 76.19
Enforcing social distance during meal pick-up/selection	28, 66.67	21, 50.00	32, 76.19	30, 71.43
Serving pre-plated/packaged meals	30, 71.43	26, 61.90	25, 59.52	24, 57.14
Utilizing touchless payment/counting/claiming systems	27, 64.29	20, 47.62	29, 69.05	28, 66.67
Having students eat meals in the classroom	18, 42.86	11, 26.19	36, 85.71	31, 73.81
Installing physical barriers and/or sneeze-guards	15, 35.71	11, 26.19	26, 61.90	25, 59.52
Spreading out meal preparation/packaging stations	20, 47.62	18, 42.86	22, 52.38	18, 42.86
Limiting number of staff members at preparation/distribution locations	21, 50.00	20, 47.62	15, 35.71	14, 33.33
Rotating staff schedules/assignments to limit exposure	11, 26.19	10, 23.81	9, 21.43	7, 16.67

Open-ended comments

Seven participants provided additional comments to the questions in the survey. One of these participants shared their experience via email. These additional comments were primarily related to staff shortage or coping with increase in prices with existing budget. Some verbatim quotes from the surveys are given below:

"[name of school district] never returned to campus after spring break 2020 and in person learning resumed Fall 2021, lots of employees lost their jobs"

"The changing cost (increases) have made it difficult to follow bid laws. The prices exceed our budgets, but we have to feed kids!"

"Many employees were off due to contracting COVID or in quarantine due to exposure."

Encouraging outcomes of the pandemic

Despite the several negative effects of the pandemic, CNDs noted a few notable encouraging outcomes (Table 5.3). Out of the 42 participants, 33 directors reported that the pandemic brought the importance of school meal programs to the community in Spring 2020. Same was true for 66.67% of participants in Fall 2020 and 61.90% participants in Spring 2021. Another notable encouraging outcome for spring 2020 was that the pandemic facilitated greater collaboration among school staff as reported by 73.81% of participants. Creativity in menu creation and adaptation was reported by 80.95% of participants for spring 2021.

Table 5.3 Encouraging outcomes of the pandemic as reported by child nutrition and food service directors in MS, LA, and WV

	Spring 2020 (n, %)	**Summer 2020 (n, %)**	**Fall 2020 (n, %)**	**Spring 2021 (n, %)**
The pandemic brought the importance of school meal programs to the community as a whole	33, 78.57	26, 61.90	28, 66.67	26, 61.90
The pandemic improved solidarity and teamwork among school meal program staff	25, 59.52	19, 45.24	23, 54.76	24, 57.14
School meal programs received assistance from the community in the form of donations	16, 38.10	4, 9.52	4, 9.52	4, 9.52
School meal programs received assistance from the community in the form of volunteers	8, 19.05	4, 9.52	1, 2.38	1, 2.38
The pandemic facilitated greater collaboration and support among all school staff (school nutrition, teachers, administration, sanitation staff, etc.)	31, 73.81	19, 45.24	24, 57.14	29, 59.52
The pandemic promoted creativity in menu creation and adaptation	23, 54.76	19, 45.24	30, 71.43	34, 80.95

n=number of participants, % = percent of total participants

Discussion

As studies indicate, the immediate stressor impact of the COVID-19 pandemic was sudden panic buying, and reduced nationwide imports and exports disrupted the food supply

significantly (Ross, 2021). As a result of these stressors, the CNDs had to adapt to extraordinary strategies to continue provide meals to children. The child nutrition COVID-19 waivers were perhaps the best policy changes that facilitated food accessibility by making it easier for parents/caregivers to pick-up or receive meals from school sites and non-school sites and by making all children eligible for school meals by relaxing eligibility conditions (USDA, 2021a). Despite the efforts of the government, the CNDs in our study reported that school meal programs witnessed reduced participation. These findings are similar to a recently published study which reported that the participation in school meal programs during spring 2020 has been ranged between 11% to 36% for children belonging to low-income population (Bauer et al., 2021). According to the CNDs, it seems that inefficient communication with the communities facilitated low participation rate. A study conducted in a low-income predominantly Latinx population reported that communication and outreach to parents via internet-only mediums are inefficient for providing updates and changes about food distribution location, hours, and pick-up times (Jowell et al., 2021). Another possible reason for reduced school meal participation is lack of transportation needed to pick up school meals (Ross, 2021). Research is needed to identify primary reasons for food inaccessibility and low participation rates in school meal programs during the COVID-19 pandemic.

Due to the nature of pandemic, there was a shift in priority of school meals from meeting nutrition guidelines to ensuring that all children are fed nutritious food without having to meet all the nutrition standards. Several directors reported using RTE and/or shelf-stable food as alternatives to fresh produce. Vending and contract foodservice companies were helpful for school nutrition staff to manage food provision and distribution processes. However, smaller school districts or those with insufficient funding were least likely to benefit from contract

foodservice companies (Kuhns & Adams, 2020). Since some directors reported packing meals d for the entire week, most foods needed further preparation by parents at their home. These adaptive strategies are temporary in nature and likely will not continue after the pandemic seizes. For example, schools stopped providing grab-and-go and meal pick up options since the schools are fully back to in-person learning. However, as informed by CNDs in our previous study, some other strategies like breakfast in classrooms are more likely to stay because of their operational feasibilities, and those are hence transformative strategies. Other temporary strategies included food distribution along bus routes or through drive through facilities at school sites or non-school sites. These strategies also implied additional voluntary work from school bus drivers. There were also concerns related to training for volunteers that delivered food who may or may not have been previously trained for following food safety protocols or HACCP guidelines (Dunn et al., 2020c).

Staff shortages were reported by the participants as monumental barriers for school meal programs. Staff furloughs and layoffs have been major concerns of the pandemic not only in school nutrition, but also in all trades and work avenues including education, industry, hospitality, tourism, and healthcare (Ross, 2021). Impact of the pandemic was compounded by the recession. While the combined impact of COVID-19 pandemic and recessions on food insecurity is still too soon to measure, previous catastrophic events have provided reasons for concern. During the Great Recession of 2008, food insecurity among children in the U.S. increased from 8.3% in 2007 to 11% in 2008, and very low food insecurity among children increased from 0.8% in 2007 to 1.43% in 2008. The COVID-19 recession of 2020, which saw more decline in the U.S. gross domestic product and unemployment rates compared to the Great Recession (Mohesky, 2020), poses a threat to child food security at increased rates.

While the pandemic has posed challenges to school nutrition staff, several non-measurable encouraging outcomes were reported by a vast majority of survey participants. Highlights from our study are better recognition of the importance of school meal programs and greater collaboration among all school staff, and within and between school districts. Directors also reported tremendous support from communities in the form of food donations and volunteers. These findings are similar to those reported in a Vermont based study and results may be similar for different natural disasters, pandemic, and events related to climate change (Belarmino, Bertmann, Wentworth, Biehl, & Neff, 2020). Because all states had different capacities to adapt and sustain to the pandemic, they responded differently to the pandemic (Kuhns & Adams, 2020). We have made an important attempt to document the efforts of the child nutrition directors from three southeastern U.S. states.

Strength and limitations

This study quantifies challenges and best practices for different school terms. Different school terms also refer to the different stages of the pandemic, implementation of adaptive and transformative strategies in programs, utilization of government regulations like the child nutrition COVID-19 waivers, and scientific progress against the spread of COVID-19 including safety measures and vaccinations. This survey had a low response rate. The survey was conducted in fall 2021, and it was a very busy time for school nutrition personnel especially because of the pandemic. Being a cross-sectional study, it limits our ability to determine any causations. The low response rate in this study does not implement high level of error. The findings from this study align with our previous study (manuscript I).

Conclusion and future implications

The pandemic showed us that sufficient food availability may not ensure adequate food accessibility. We speculate that while sufficient efforts were made by the government and the responsible personnel to ensure child food security, reduced participation in school meal programs may reflect several undocumented hinderances to food accessibility from parents' perspectives. Further research is warranted to find food accessibility issues through parents' perspective and assess the differences among different racial, ethnic, and income groups. Based on this study, it can be concluded that because of the timely policy level interventions like the COVID-19 child nutrition waivers and related ease of access to school meals, the school meal programs personnel were able to implement certain measures that increased the resilience capacity of the school meal programs.

CHAPTER VI

Manuscript III: EXPERIENCES OF THE PARENTS/CAREGIVERS REGARDING SCHOOL MEALS DURING THE COVID-19 PANDEMIC[3]

INTRODUCTION

The COVID-19 pandemic brought unprecedented changes to daily life. The sudden surge of the pandemic greatly changed the household environment, disrupted food supply chain, facilitate panic buying, changes in jobs including job losses, and impacted healthcare as we know it (Adams et al., 2020). At national federal level, the USDA introduced the COVID-19 child nutrition waivers that would ease the eligibility requirements for school meal programs for children and administrative regulatory requirements for school staff (USDA, 2021b). The year 2020 witness beyond the spread of pandemic. As a result of pay reduction, job losses, and other economic impacts, it was projected that the U.S. will continue to witness an increase in food insecurity despite global efforts to reduce hunger. Hence there has been a rising concern to ensure access to safe and nutritious food for children during and after the pandemic. A school meal provision process that would continue to efficiently provide safe and nutritional food to all children would be resilient in nature. However, the COVID-19 pandemic was significant shock

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[3] *This study was funded by the 2022 Graduate Student Council Research Grant G01 and the 2022 Achieving Equity Investment Grant. Part of results were presented at the 2022 MSPHA conference*

event for school meal programs, thus bringing school meal programs resiliency into question. Immediate adaptive strategies needed to address the disrupted food supply chain issues and unhealthy household food environment (Akseer et al., 2020). Several researchers suggested preliminary approaches to address child food insecurity during the COVID-19 pandemic. Some of the adaptive strategies suggested were centralization of meal distribution, providing means for multiple days, and temporary modification of policies that seem to deter participation in school meal programs (Dunn et al., 2020a).

However, it cannot be denied that shocks and stressors do not impact all population groups in the same manner. Racial and ethnic minorities have higher burden of underlying comorbidities that increase the risk of suffering through chronic diseases and any novel infections like the COVID-19 disease (Hill & Holland, 2021; Hooper et al., 2020). Due to existing economic, racial, and ethnic disparities in food and healthcare accessibility, disproportionate impact of food insecurity on marginalized populations is more likely. Beyond physical access, healthy foods are often priced higher than calorie-dense, shelf-stable foods (Alkon et al., 2020). An online study conducted on U.S. parents reported that during the pandemic, families purchased more shelf-stable and calorie-dense foods including snacks, desserts, and processed food, thereby decreasing nutrition security of children (Adams et al., 2020). Additionally, Black, Latinx, and Indigenous communities have been reported to be disproportionately being impacted by COVID-19 from infections, illnesses, pay reductions, and job losses (Alkon et al., 2020; American Academy of Pediatrics, 2020; Belanger et al., 2020). This implies greater chances of food inaccessibility and poor diet and hence related negative outcomes like developmental issues and mortality. American Academy of Pediatrics recommended that school reopening planning should consider families already experiencing food

insecurity and how that impacts current food security status in children especially those belonging to disadvantaged communities (American Academy of Pediatrics, 2020). Another important aspect of food insecurity is that the counties and states with the highest rate of food insecurity are also home to a large proportion of marginalized populations (Feeding America, 2020a).

Disparities in food accessibility remain a topic of concern during the pandemic. Thus, we conducted this study is to assess the racial and ethnic differences in the experiences of parents/caregivers regarding school meals during the COVID-19 pandemic, and how those experiences are different from the perceptions of child nutrition directors. Specific objectives of the study are (1) to develop a survey questionnaire that explores the school meal provision experiences of parents/caregivers and (2) to assess racial and ethnic disparities in their experiences, and (3) to compare the differences between the strategies adapted by the directors and the experiences of parents/caregivers regarding food provision and food distribution methods.

METHODS

Procedure

Recruitment and measurement protocol were exempted by the University of Mississippi's Institutional Review Board (Protocol 22x-146) (Appendix B).

Survey development

Step 1: Preliminary item writing: Preliminary question items were developed by three researchers based on focus group findings from our previous study and guided by the resilience capacity model. Special attention was paid to grammar, language, clarity, and the use of

technical terms in the questionnaire. The questionnaire items were discussed several times over until all the three authors agreed to the set of items.

Step 2: Content validity: Further, the questionnaire was sent to subject experts via emails that included the aims, objectives, brief description of the study, and the procedures for assessment of question items (DiIorio, 2005). These personnel included subject experts in school nutrition and survey development (five with a doctorate degree and two doctoral candidates) (Zamanzadeh et al., 2015).

Step 3: Pilot study and face validity: The questionnaire was discussed with the subject experts for their wording, comprehension, and difficulty level. A small conveniently selected sample of MS child nutrition directors (n=5) was used to conduct pilot study to determine the face validity using participants' and experts' suggestions (Zamanzadeh et al., 2015). The feedback was incorporated into the final questionnaire.

Final questionnaire

The final survey questionnaire contained 32 questions (Appendix G). The first three questions about basic information related to the survey participants, like the name of their school district, their relationship to the child, and the state in which they are located. Items 4-7 in the assessed the parents'/caregivers' perception of the impact of the pandemic on receiving school meals. Items 11-16 in the third module assessed personal challenges (unavailability of transportation, receiving food from churches or local organizations, and meal pick-up times coinciding with working hours) and institutional challenges (running out of school meals, not having variety in foods offered, and reduced food availability). Items 17-20 assessed the types of food received by parents/caregivers. The options given were entrees/sides needing further preparation, shelf-stable meals not needing further preparation, ready-to-eat foods served hot

and/or cold, or bulk foods provided to the family. Items 21-26 explored the modes of delivery of meals used by the child or the respondent for while the learning was remote, hybrid, or in-person. Items 17-26 were corresponding to items 21-30 from the survey distributed to child nutrition directors (Appendix G). The last module (item 27-34) had questions related to racial and ethnic identity of the child and the respondent as well as change in employment status of the respondent for different school terms. Item-wise content validity index (CVI) for all the 32 items is provided in Appendix I.

Survey distribution

The survey was distributed through Qualtrics services (Qualtrics, 2021). The intended target audience was those parents and caregivers in MS, LA, and WV that had utilized school meals at any time from March 2020 to December 2021. The final survey questionnaire was embedded in Qualtrics, and participants were provided incentives through Qualtrics services. There was a total of 314 responses. After rejecting the incomplete survey questionnaires, the final respondent count was 307.

Data Analysis

Item level content validation index (I-CVI) was calculated for each item (Uggioni & Salay, 2013; Zamanzadeh et al., 2015). Descriptive statistics were conducted on survey results. Fisher's exact test was used to determine if there was a significant association between race and challenges related to school meal programs. Significance was kept at $p<0.05$. An independent *t* test was conducted to compare the differences between the strategies adapted by the directors (n=42) in Study 2 and the experiences of parents/caregivers (n=307) regarding food provision and food distribution methods. To conduct independent t-test, variables were measured on a scale of 0-4 where a score of "0" implied that the statement was not true for the respondent in

any of the four terms (spring 2020, summer 2020, fall 2020 and spring 2021), and a score of "4" implied that the statement was true for the respondent for all the four terms.

All statistics were performed in SPSS (IBM SPSS Statistics for Windows, Version 27.0. Armonk, NY: IBM Corp). MS-Excel was used to create graphical representation of the data (Microsoft, 2022).

RESULTS

Demographics

Table 6.1 provides demographic details of the study population. Out of 307 participants, 45.6% were from Louisiana, 30.29% from Mississippi, and 24.10% from West Virginia. Most survey participants were mothers of school going children (70.36%), were white (65.80%), and were not Hispanic or Latinx (93.16%). Participants were also asked about their child's race and ethnicity, for which 62.87% were White and 25.41% were Blacks or African Americans, and 9.12% were Hispanic or Latinx. None of the survey participants or their child were Native Hawaiians or Pacific Islander, and 8.47% participants reported that their children identified as multi-racial.

Table 6.1 Demographic characteristics of study participants (n=307)

	n	**%**
State		
MS	93	30.29
LA	140	45.60
WV	74	24.10
Relationship to child		
Child's mother	216	70.36
Child's father	68	22.15
Child's caregiver (family)	23	7.49
Child's caregiver (not family)	0	0
Respondent's race		
White	202	65.80
Black or African American	82	26.71
Native American or Alaska Native	8	2.61

Asian	6	1.95
Native Hawaiian or Pacific Islander	0	0
Multi-racial	9	2.93
Not sure/refused	0	0
Respondent ethnicity		
Hispanic or Latinx	21	6.84
Non-Hispanic or Non-Latinx	286	93.16
Child's race		
White	193	62.87
Black or African American	78	25.41
Native American or Alaska Native	3	0.98
Asian	5	1.63
Native Hawaiian or Pacific Islander	0	0
Multi-racial	26	8.47
Not sure/refused	2	0.65
Child's ethnicity		
Hispanic or Latinx	28	9.12
Non-Hispanic or Non-Latinx	279	90.88

School meals utilized during different school terms

Parents were asked if they utilized school meals during different school terms (Figure 6.1). School breakfast and lunches were the most utilized school meals for spring 2020 (breakfast = 68.08%, lunch = 91.21%), fall 2020 (breakfast = 67.75%, lunch = 89.90%), as well as spring 2021 (67.43%, lunch = 89.58%). For summer 2020, 61.56% participants reported that they utilized school meals.

Mode of payment for utilized school meals

Participants were asked about the mode(s) of payment, if any, used for receiving school meals (Figure 6.2). A majority of participants (>65%) reported that they received meals free of cost for spring 2020, fall 2020 and spring 2021. For summer 2020, 57.33% participants utilized free meals.

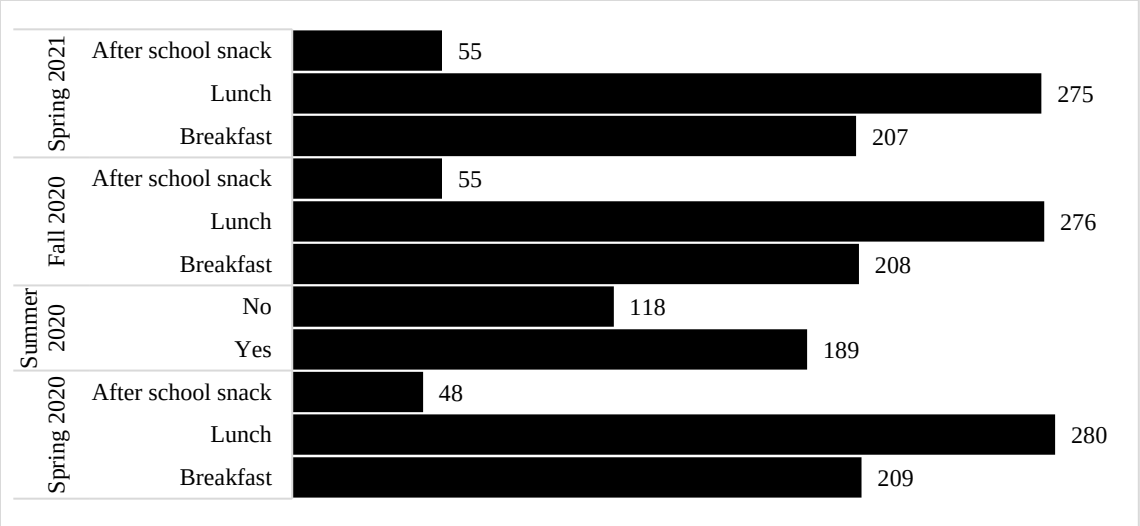
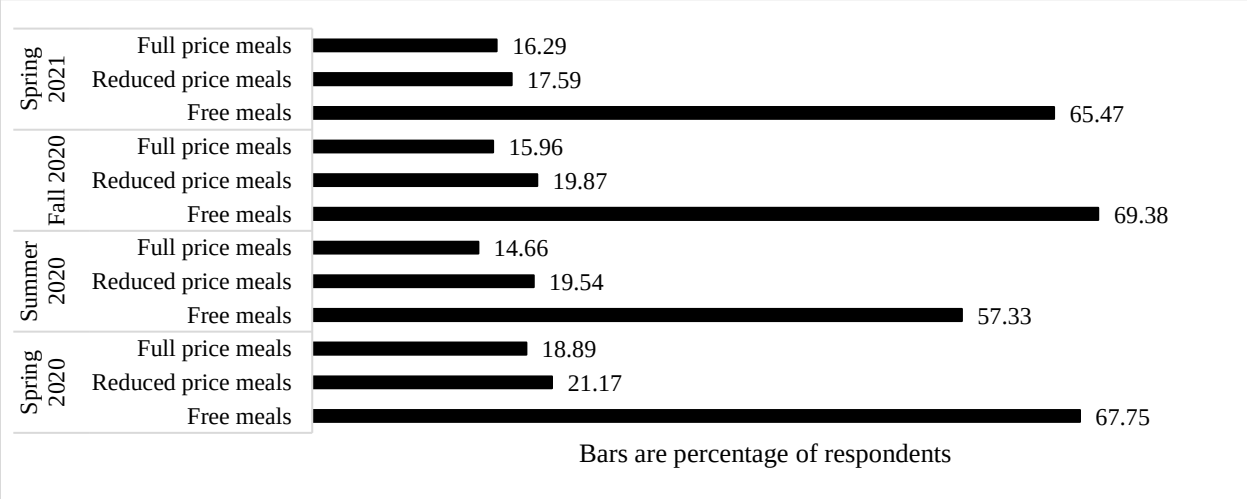


Figure 6.1 Number of parents/caregivers (out of n=307) who reported that their child utilized school meals during different school terms



Data is expressed as percentage of participants

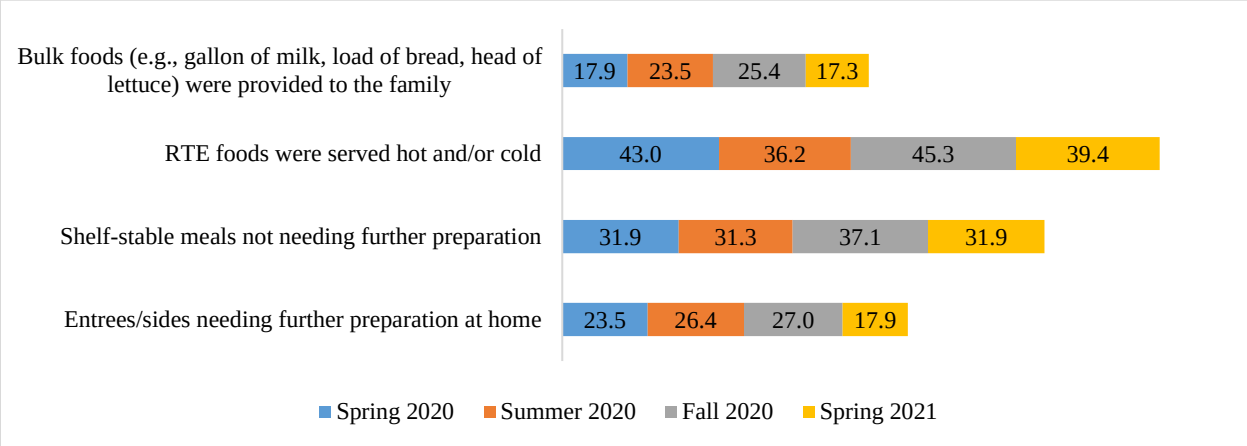
Figure 6.2 Percentage of participants (n=307) reporting the mode of payment used for receiving school meals over different school terms

Food distribution and provision

Participants were inquired about the types of food they received and the modes of food distribution they received or utilized. Ready to eat (RTE) foods were the most common food type reported by majority percentage of participants for all school terms. Less than 26% of participants for any school term reported that they were provided bulk foods for further cooking. Shelf-stable meals not needing further preparation at home were the second most reported food

type after bulk foods. Figure 6.3 shows a graphical representation of types of food received by parents expressed as percentage responding.

For spring 2020 when the pandemic had just begun, take home meals were the most reported mode of food distribution (32.90%). For summer 2020, take home meals (29.97%) and meal pick up from selected school sites were the most reported (29.97%) modes of food distribution. For fall 2020, more than 30% participants reported different meal provision methods used except picking up meals at non-school sites (Figure 6.4). By spring 2021, 38.44% participants reported that the meals were eaten in the cafeteria.

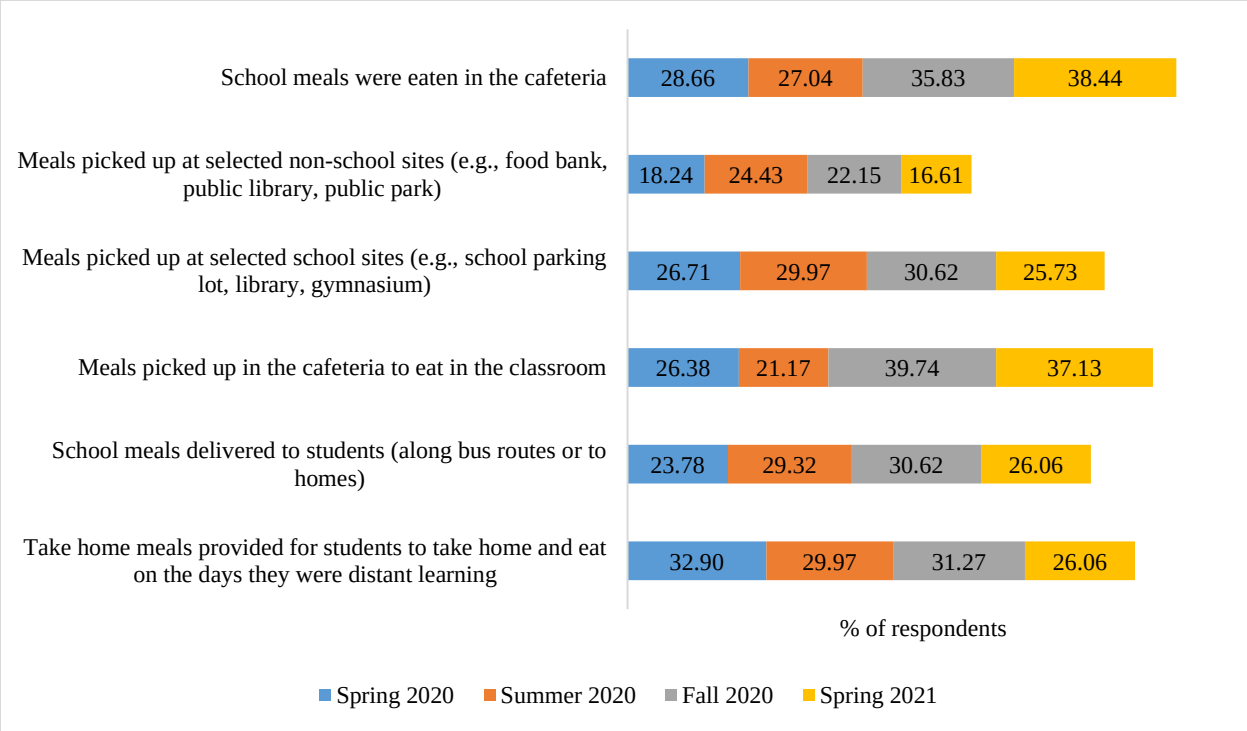


Data is expressed as percentage of total participants

Figure 6.3 Types of food received or utilized by parents/caregivers for spring 2020 – spring 2021 school terms

Challenges faced by parents/caregivers

Despite the efforts of the government and the school districts, several parents/caregivers reported challenges they faced during the pandemic regarding school meal programs. These challenges included transportation, meal pick-up time, and reduced variety and availability of food. For spring 2020, most directors reported no transportation to pick up school meals (n=69) and lack of variety in food (n=69) as their primary concerns.



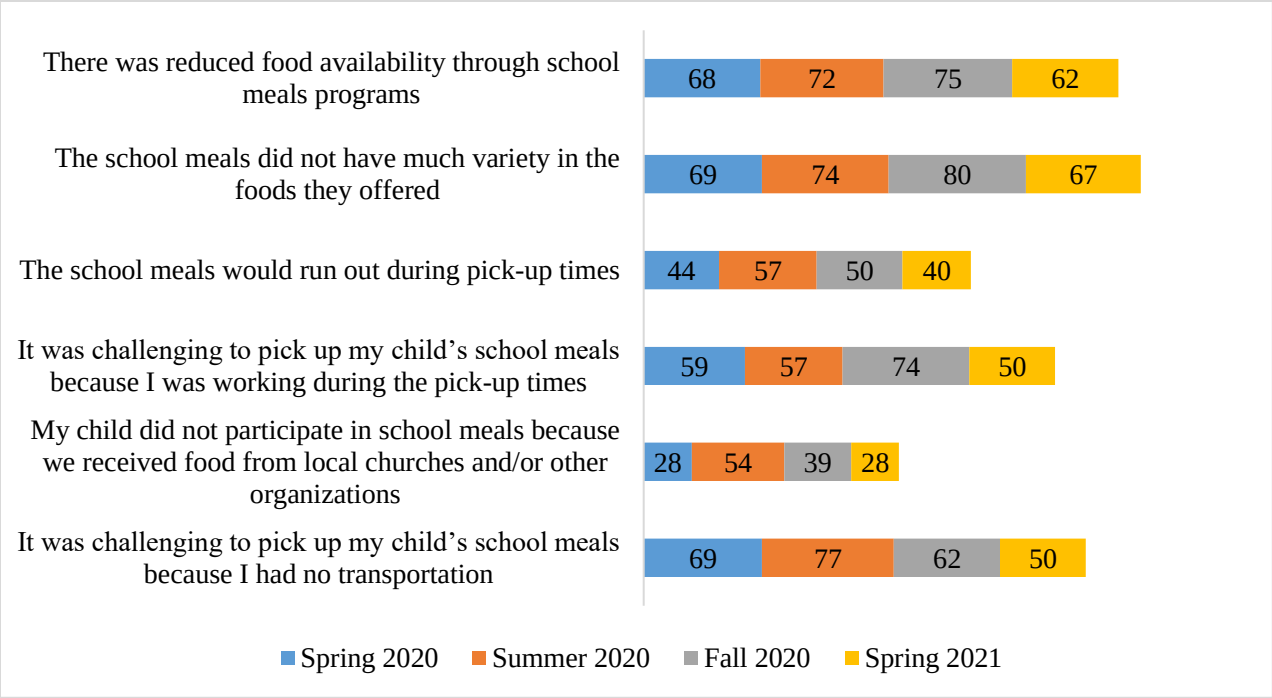
Data is expressed as percentage of total participants

Figure 6.4 Mode of food distribution through which parents/caregivers received school meals For spring 2020 – spring 2021 school terms

For summer 2020, 77 participants reported having no access to transportation to pick up school meals. For fall 2020, 80 participants reported no variety in food, whereas 74 participants reported that they had difficulty in meal pick-up time because they had to work during pick-up times. For spring 2021, lack of variety in school meals (n=67) and reduced food availability (n=62) remained most reported concerns. The challenges reported above were compared across different racial groups (Tables 6.2, 6.3). It was found that challenges combined for all the four school terms did not vary significantly across different racial groups.

Fisher's exact test was used to determine if there was a significant association in the differences in parents'/caregivers' experiences regarding challenges related to school meal programs (Table 6.2). Fisher's exact test showed that there was significant association between race and experiencing transportation challenges (p<0.001). A majority of white

parents/caregivers (67.3%) and Asian parents/caregivers (66.7%) reported that transportation was never a challenge for them to access school meals compared to Blacks (41.2%) and multiracial (22.2%) parents/caregivers. Challenges related to transportation were true for three school terms for 3.5% White, 9.8% Black or African Americans, and 11.1% multi racial parents/caregivers.



Data is expressed as number of participants

Figure 6.5 Challenges faced by parents/caregivers regarding school meal provision process during school terms spring 2020 - spring 2021

None of the Native American/Alaskan Natives, Asian or multi-racial parents/caregivers reported receiving food from local organizations like churches for more than two school terms. However, 3.5% White and 2.4% Black parents/caregivers reported that they received food from churches and didn't have to utilize school meals. Similar to transportation challenges, a significant association was found between race and conflicting working hours with meal pick-up times (p=0.022). with 66.3% of White and 50% of Asian parents/caregivers reporting they did

not face conflicting work and meal pick-times in any of the school terms. More than half of Black parents/caregivers (52.4%) who reported on hat meal pick-up times were conflicting to their working hours for at least one school term. A majority of White (69.3%), Black (57.3%), and Asian (62.5%) parents/caregivers reported that they never experienced schools running out of school meals for any school terms spring 2020-spring 2021. However, 5.4% White, 2.4% Black, and 16.7% Asian parents/caregivers reported that they experienced schools running out of school meals for all four school terms. There was a significant association between races and experiencing schools running out of food ($p<0.001$).

Directors' perceptions and parents/caregivers' experiences

An independent t-test was conducted to analyze the difference in the perceptions of directors and experiences of parents/caregivers regarding school meal programs. As shown in Table 6.3, some statements showed significant differences in the perceptions of directors and experiences of parents/caregivers. It was found that the 307 parents (*M* 1.64, *SD* 1.59) experienced receiving significantly lesser RTE foods than what 42 directors reported [t (347) = -4.86, $p<0.001$]. It was also found that the parents/caregivers (*M* 1.20, *SD* 1.39) experienced receiving significantly lesser take home foods than what directors reported [t (347) = - 1.98, $p<0.049$]. Parents (*M* .81 *SD* 1.25) reported experiencing picking up meals from non-school sites like food banks more than what directors perceived (*M* .14 *SD* .57) [t (347) = 3.43, $p<0.001$].

Table 6.2 Racial differences in the experiences of parents/caregivers regarding school meal programs related challenges during the COVID-19 pandemic

Statement		White N	Black or African Americans N	Native American or Alaska Native N	Asian N	Multi-racial N	Fisher's exact test	Exact sig. (2-sided)
It was challenging to pick up my child's school meals because I had no transportation	Challenge not true or true for only one school term	167	132	21	16	30	19.805	<0.001
	Challenge true for more than one school term	35	32	3	8	24		
My child did not participate in school meals because we received food from local churches and/or other organizations	Challenge not true or true for only one school term	185	136	24	16	48	17.523	<0.001
	Challenge true for more than one school term	17	28	0	8	6		
It was challenging to pick up my child's school meals because I was working during the pick-up times	Challenge not true or true for only one school term	172	124	18	20	36	11.186	0.022
	Challenge true for more than one school term	30	40	6	4	18		
The school meals would run out during pick-up times	Challenge not true or true for only one school term	176	128	21	12	42	19.189	<0.001
	Challenge true for more than one school term	26	36	3	12	12		
The school meals did not have much variety in the foods they offered	Challenge not true or true for only one school term	154	122	21	12	48	14.963	0.004
	Challenge true for more than one school term	48	42	3	12	6		
There was reduced food availability through school meals programs	Challenge not true or true for only one school term	160	114	21	12	42	13.612	0.008
	Challenge true for more than one school term	42	50	3	12	12		

Table 6.3 Differences in the perceptions of directors and experiences of parents/caregivers regarding school meal programs during the COVID pandemic

	Parents (n=307)		Directors (n=42)		Levene's Test for equality of variances		t-test for Equality of Means						
	M	SD	M	SD	F	Sig	*df*	*t*	*p*	Mean Difference	Cohen's *d*	95% confidence interval of the Difference	
												Lower	upper
Types of food distributed													
Entrees/sides needing further preparation at home	.95	1.31	1.07	1.33	.99	.32	347	-.57	.566	-.12	-.094	-.547	.300
Shelf-stable meals not needing further preparation	1.32	1.51	1.60	1.53	.13	.72	347	-1.10	.274	-.27	-.180	-.762	.216
RTE foods were served hot and/or cold **	1.64	1.59	2.88	1.31	8.34	.00	347	-4.86	<.001	-1.24	-.799	-1.746	-.739
Bulk foods (e.g., gallon of milk, load of bread, head of lettuce) were provided to the family	0.85	1.25	.57	1.11	.86	.35	347	1.32	.187	.27	.218	-.131	.669
Food provision methods													
Take home meals provided for students to take home and eat on the days they were distant learning *	1.20	1.39	1.67	1.66	7.04	.01	347	-1.98	.049	-.46	-.325	-.927	-.002
School meals delivered to students (along bus routes or to homes) *	1.10	1.39	.62	1.10	4.80	.03	347	2.13	.034	.48	.351	.038	.920
Meals picked up in the cafeteria to eat in the classroom	1.24	1.38	1.43	1.47	1.57	.21	347	-.80	.422	-.18	-.132	-.635	.266
Meals picked up at selected school sites (e.g., school parking lot, library, gymnasium)	1.13	1.36	1.19	1.42	.21	.23	347	-.27	.790	-.06	-.044	-.503	.383
Meals picked up at selected non-school sites (e.g., food bank, public library, public park) **	.81	1.25	.14	.57	29.22	.23	347	3.43	<.001	.67	.564	.286	1.057
School meals were eaten in the cafeteria	1.30	1.43	1.07	1.35	.24	.62	347	.98	.330	.23	.161	-.232	.688

*p<0.05, **p<0.01

Discussion

Immediate impact of the pandemic: The important relationship between resilience and food security is that the immediate mitigation strategies during an emergency like the COVID-19 pandemic are designed by assessing which dimensions of resilience framework are affected the most by the shock (Brück & d'Errico, 2019). The child nutrition waivers eased eligibility requirement for school meals and also focused on providing meals to children on non-school sites as well as at multiple times during the day (USDA, 2021b). One research study conducted early in the pandemic argued that there was a 15% increase in food availability to children as a result of the USDA allowing all NSLP meals to be provided free of charge from March 2020 to June 2020 (Niles, Bertmann, Morgan, et al., 2020). The COVID-19 child nutrition waivers made also allowed parents/caregivers to pick up school meals for their children. Though the grab-and-go options were offered to increase overall meal participation, an overall reduced rate of participation in school meal programs was witnessed. The waivers facilitated that the school meals were allowed to be provided free of cost to all children regardless of their socioeconomic status, however, the administrative burden of processing COVID-19 child nutrition waivers also limited the ability of schools to implement these waivers (Fleischhacker & Campbell, 2020; Leib et al., 2020). For example, some schools did not implement programs like the seamless summer option because of increasing food prices and lower meal reimbursement rates (Fleischhacker & Campbell, 2020). Reimbursement also means that the schools have to rely on their existing resources to facilitate school meal provision process, thus making it difficult for smaller school districts to implement school meal programs (Kuhns & Adams, 2020). A 2020 report stated that less than a third of the participants in their data were receiving some kind of school meals, implying that despite the federal efforts, school meals were not reaching the most vulnerable

populations (Gupta et al., 2020). The participants of our study also cited many possible reasons for reduced school meals participation. First, parents/caregivers did not have the necessary transportation to pick up school meals. Second, the meal pick-up times were limited to 2-3 times a week during weekdays. The pick-up times would conflict with the working hours for parents/caregivers, thus making it difficult for them to obtain school meals for their children. Several modes of food distribution and provision were provided by different schools depending on their operational capacities. In our study, we found that RTE foods to be consumed at home were the most reported mode of food distribution and provision during the pandemic. RTE foods are mostly shelf-stable, easier to provide resulting in a reduce workload for school staff and reduced preparation load for parents/caregivers.

Racial disparities in experiences of parents/caregivers: The shock of the COVID-19 pandemic was an unusually challenging event impacting child food security. Prior to the pandemic, over 11 million children in the U.S. were food insecure (Fry-Bowers, 2020). Especially in marginalized populations, the hardships caused by existing poverty and structural disparities have a remarkably strong negative impact in circumstances like those of COVID-19 pandemic with decreasing income, increasing food shortage, and rising prices (Borkowski et al., 2021). The immediate public response was panic buying and stocking up of food and other essential items. However, the disadvantaged populations do not have the same means to purchase and store food, thereby exacerbating food insecurity for them (Feeding America, 2020b). In our study, we found a disproportionate impact of the COVID-19 pandemic on receiving school meals during the pandemic. Incidence of child food insecurity increased as the pandemic progressed through different stages and this increase was also disproportionate for Black and other racial minorities (Jablonski et al., 2021; Kinsey et al., 2020). While these results do not come as a

surprise, it is important to consider the long-term impacts in regard to child food security and thereafter physical and mental health. Despite federal level efforts to ensure food provision to all children, we found that the existing resources were not sufficient with children belonging to marginalized racial groups that deterred their ability to utilize federal provisions regarding school meals. In fact, based on our study, we also agree with a recently published commentary that the impact caused by the pandemic, would widen the impact of existing structural disparities (Fraiman et al., 2021; Jablonski et al., 2021). Food from churches, food banks, and local organizations were an important source of receiving food for participants of our study. A recently published study also reported that charitable food was received by most vulnerable populations like those families who lost jobs during the pandemic or those belonging to Black parents (Gupta et al., 2020). It is clear from our study and the previously published studies that the structural inequities are the root cause of disproportionate child food insecurity impact of the COVID-19 pandemic and the pandemic itself exacerbated the existing hardships for disadvantaged populations (Zviedrite et al., 2021).

Strengths and limitations

We identify three major strengths of this study. First, this study provides parents'/caregivers' perspective and compared it with child nutrition directors regarding their experiences of school meal programs. Second, our study explored how their experiences were different because of their racial identities. Third, we provide a strong foundation to advocate considering parents'/caregivers' socio-demographic characteristics when planning emergency policies related to children. Our research study has certain limitations worth noting. First, this is a cross-sectional study, and a causal inference cannot be determined based on this study design. Second, since the study was conducted using internet facilities, and it may have neglected input

from those population groups without access to internet or ‘smart’ devices. For future research building on this study, it is suggested to follow or develop methods that would allow a more inclusive sample population to participate.

Conclusion and future implications

This study provides us two major findings that should form the foundation for developing future emergency feeding practices. First, while implementing child nutrition related policies, parents’/caregivers’ limitations related to transportation and conflicting timings should not be neglected. Second, social determinants of health should not be neglected during planning purposes. For example, during the pandemic, the disadvantaged population groups faced difficult access to non-school sites and all parents’/caregivers’ houses were not on the delivery routes for school buses. For future research, we suggest exploring challenges specific to disadvantaged population groups and learn more on how they accessed food for their children during the pandemic. Similar research is also suggested for different states across the U.S. to understand how these experiences differed across states and counties and how existing schools’ institutional frameworks impact emergency feeding practices.

CHAPTER VII

CONCLUSION

Our research study is guided by the conceptual resilience capacity model. For the dissertation study the conclusion is explained based on the RCM components.

Disturbance component: The COVID-19 pandemic was the 'shock' the led to 'stressors' like school closures, social distancing and mask mandate, and extraordinary food safety measures.

Resilience capacity: Resilience capacity is composed of absorptive capacity, adaptive capacity, and transformative capacity governed by absorptive, adaptive, and transformative strategies. With the help of policy level intervention, that is, the COVID-19 child nutrition waivers, schools were able to take actions like providing grab-n-go facilities, delivering school meals to children's houses, expanding access to make all children eligible for school meals regardless of the socioeconomic status, and ensuring children receive an adequate meal even with relaxed nutrition standard guidelines.

Reaction to disturbance: We received child nutrition directors' perspectives and in-depth information of the institutional and policy level challenges they faced and the strategies they implemented for the continuation of the school meal programs. We also received information of parents'/caregivers' experiences regarding school meal programs to help us decide whether or not the school meal programs in general were resilient in nature. It can be determined that the impact of the COVID-19 pandemic has been worse and has greatly impacted vulnerable populations. However, we assert that because of the timely actions taken by the government and

the efforts of the school staff, the school meal programs were on a resilient pathway and restore their functioning better than before the pandemic. Were the U.S. school meals programs not resilient, the COVID-19 pandemic would have had an even worse impact on child food security. Some of the key determinants of resilient school meal programs include the readiness of school meal program personnel acting at local level including child nutrition directors, managers, cooks, and drivers. Given that food availability, food prices, and volunteer help played a decisive role in determining the resilience capacity of school meal programs, the main problems associated with child food security were related to the existing structural inequities and not because of inadequacies of school meal programs personnel. The structural inequities were a cause for disproportionate impact of the pandemic on school going children and addressing the inequities are also the solutions for more impactful school meal programs (Klassen & Murphy, 2020). In fact, we argue that should the structural inequities be addressed at a rate greater than current, the personnel involved in ensuring child food security through school meals have the potential of adapting in extreme circumstances like the COVID-19 pandemic. The pandemic brought into forefront the struggles, efforts, and success despite the challenges of the school meal programs.

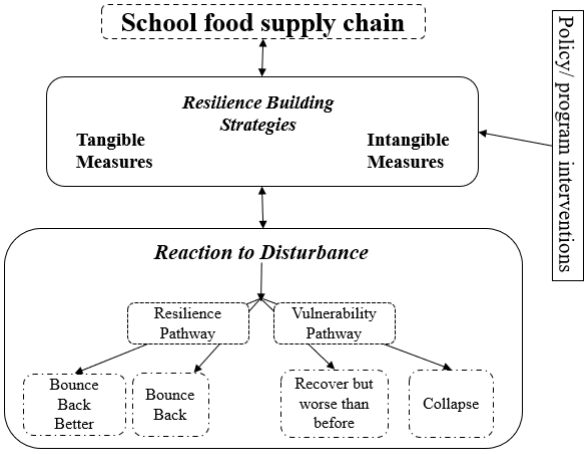


Figure 7.1 Resilience pathway vs vulnerability pathway from resilience conceptual model

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APPENDICES

Appendix A. IRB approval for study 1 [exempt]

THE UNIVERSITY of MISSISSIPPI

Kritika Gupta <kgupta3@go.olemiss.edu>

IRB Exempt Determination of 21x-206

irb@olemiss.edu <irb@olemiss.edu> Mon, Feb 22, 2021 at 1:24 PM
To: Kritika Gupta <kgupta3@go.olemiss.edu>
Cc: Georgianna Mann <grmann@olemiss.edu>

PI:

This is to inform you that your application to conduct research with human participants, "Best Practices in south-eastern US school meal programs during the COVID-19 Pandemic: Focus Group Discussions" (Protocol #21x-206), has been determined as Exempt under 45 CFR 46.101(b)(#2). You may proceed with your research.

Please remember that all of The University of Mississippi's human participant research activities, regardless of whether the research is subject to federal regulations, must be guided by the ethical principles in The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research.

It is especially important for you to keep these points in mind:

- You must protect the rights and welfare of human research participants.
- Any changes to your approved protocol must be reviewed and approved before initiating those changes.
- You must report promptly to the IRB any injuries or other unanticipated problems involving risks to participants or others.
- If research is to be conducted during class, the PI must email the instructor and ask if they wish to see the protocol materials (surveys, interview questions, etc) prior to research beginning.

If you have any questions, please feel free to contact the IRB at irb@olemiss.edu.

COVID-19 Update: The UM IRB/IACUC is continuing operations while working remotely. The fastest way to reach our staff is via email at irb@olemiss.edu/iacuc@olemiss.edu.

Miranda Core

IRB Administrative Office

Research Integrity and Compliance

Office of Research and Sponsored Programs

The University of Mississippi

100 Barr Hall

University, MS 38677-1848

irb@olemiss.edu | www.olemiss.edu

For timely updates related to research activities during the COVID-19 pandemic, please visit: keepdiscovering.olemiss.edu

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REMINDER: YOU CANNOT HAVE CONTACT WITH RESEARCH SUBJECTS UNTIL YOU RECEIVE THE FORMAL IRB PROTOCOL APPROVAL LETTER OR EMAIL

Appendix B. IRB approval for study 2 [exempt]

THE UNIVERSITY of MISSISSIPPI

Kritika Gupta <kgupta3@go.olemiss.edu>

IRB Exempt Determination of 22x-146

irb@olemiss.edu <irb@olemiss.edu> Thu, Jan 13, 2022 at 12:41 PM
To: Kritika Gupta <kgupta3@go.olemiss.edu>

PI:

This is to inform you that your application to conduct research with human participants, "To explore the barriers and challenges faced by child nutrition directors and parents/caregivers during the COVID-19 pandemic" (Protocol #22x-146), has been determined as Exempt under 45 CFR 46.101(b)(#2). You may proceed with your research.

Please remember that all of The University of Mississippi's human participant research activities, regardless of whether the research is subject to federal regulations, must be guided by the ethical principles in The Belmont Report: Ethical Principles and Guidelines for the Protection of Human Subjects of Research.

It is especially important for you to keep these points in mind:

- You must protect the rights and welfare of human research participants.
- Any changes to your approved protocol must be reviewed and approved before initiating those changes.
- You must report promptly to the IRB any injuries or other unanticipated problems involving risks to participants or others.
- If research is to be conducted during class, the PI must email the instructor and ask if they wish to see the protocol materials (surveys, interview questions, etc) prior to research beginning.

If you have any questions, please feel free to contact the IRB at irb@olemiss.edu.

IRB Administrative Office

Research Integrity and Compliance

Office of Research and Sponsored Programs

The University of Mississippi

100 Barr Hall

University, MS 38677-1848

irb@olemiss.edu | www.olemiss.edu

Please Note:

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The University will close for the holidays at the end of the day Tuesday, December 21 and reopen on Monday, January 3. Please expect longer than normal turnaround times for items submitted after December 13. Thank you for your patience and understanding.

- Please be aware that new materials (protocols, amendments, progress reports) need to be submitted via our new online portal : Submit an IRB Protocol | Research, Scholarship, Innovation, and Creativity (olemiss.edu)

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REMINDER: YOU CANNOT HAVE CONTACT WITH RESEARCH SUBJECTS UNTIL YOU RECEIVE THE FORMAL IRB PROTOCOL APPROVAL LETTER OR EMAIL

Appendix C. Recruitment email to invite child nutrition/foodservice directors for focus group discussions

SUBJECT LINE: Best practices in south-eastern US school meal programs during the COVID-19 Pandemic: Focus Group Discussions

Dear (insert director name here),

My name is Kritika Gupta, and I am a doctoral student in Nutrition at the University of Mississippi. I am writing to seek your assistance. I would like to explore how schools adapted during the COVID 19 pandemic and ensured they were providing nutritious and safe meals during school closures. Because of your position and experience with managing school meals during the COVID-19 pandemic, I would like to invite you to take part in a small focus group discussion to be held virtually using Zoom. I will be asking you questions and then recording your responses. The focus group should last no longer than one hour. This has been an extremely difficult year, especially for child nutrition programs. By investigating how different child nutrition directors adapted to ensure continuous meal service for their students, I will be able to obtain valuable information on best practices that may be used as a training tool. If you are willing to participate, please let me know so I can send you additional information and answer any questions you may have. Participation in this Focus Group Discussion session will be compensated by incentives of $50 Amazon Gift Cards. I intend to conduct the discussions in March.

Yours sincerely,

PI: Kritika Gupta, MS (she/ her)
Ph.D. Candidate (ABD)
Director of Academic and Professional Development, Graduate Student Council
SNEB Student Division Chair
The University of Mississippi
Department of Nutrition and Hospitality Management

Dissertation chair: Georgianna Mann, PhD
Assistant Professor
SNEB Division of Nutrition Education for Children, Immediate Past Chair
Graduate Program Coordinator
The University of Mississippi
Department of Nutrition and Hospitality Management
P.O. Box 1848
220 Lenoir Hall
University, MS 38677-1848
662-915-2621
grmann@olemiss.edu | www.olemiss.edu

Appendix D. Focus groups consent form

Consent to participate in research

Study Title: *Best Practices in south-eastern US school meal programs during the COVID-19 Pandemic: Focus Group Discussions*

Investigator	**Faculty Sponsor 1**	**Faculty Sponsor 2**
Kritika Gupta Student, M.S. Department of Nutrition and Hospitality Management 108 Lenoir Hall University of Mississippi University, MS 38677 +1 (662) 915-7371 kgupta3@go.olemiss.edu	Georgianna Mann Faculty, Ph.D. Department of Nutrition and Hospitality Management 108 Lenoir Hall University of Mississippi University, MS 38677 +1 (662) 915-7371 grmann@olemiss.edu	Laurel Greenway Lambert Faculty, Ph.D., RDN Department of Nutrition and Hospitality Management 108 Lenoir Hall University of Mississippi University, MS 38677 +1 (662) 915-7371 lambertl@olemiss.edu

Key information for you to consider

- **Voluntary consent.** You are being asked to volunteer for a research study. it is up to you whether you choose to participate or not. there will be no penalty or loss of benefits to which you are otherwise entitled if you choose not to participate or discontinue participation.
- **Purpose.** The purpose of this research is to use focus group discussions to see how schools adapted to ensure efficient and safe mail distribution during the COVID-19 pandemic school closures and school reopening.
- **Duration.** It is expected that your participation will last 60 minutes.
- **Procedures and Activities.** You will be asked to participate in virtual focus group discussions on how different child nutrition directors adapted to ensure continuous meal service for the students.

- **Risks.** You may be concerned about confidentiality. However, the data will be de-identified so participants and their statements cannot be identified or connected with them.
- **Benefits.** You will receive amazon gift cards of $50 for participation in the Focus Group discussion for the full duration. You will have the benefit of sharing your experiences and learning how other child nutrition directors addressed the issues of COVID-19 in successfully providing student meals. Researchers hope to use the insightful information provided by the focus group participants to develop a training tool for other child nutrition directors.
- **Alternatives.** Participation is voluntary but you may stop participating at any time.

What you will do for this study

We are requesting you to be one of the participants in a small focus group discussion. It will be held virtually via Zoom on a day and time best suitable for all the participants. Confirmation of time will be obtained by the investigator 2 weeks prior to the session. Consent forms will be digitally signed by the participants before or on the day of focus group discussions. It is recommended that both audio and video are turned on during the session. This session will be recorded for data analysis. You will be asked questions related to menu changes, food procurement, food preparation, and food distribution during the COVID-19 pandemic.

Video recording

The focus groups discussion session will be recorded on Zoom for data analysis.

Time required for this study

This study will take about 60 minutes.

Possible risks from your participation

You may be concerned about confidentiality. However, the data will be de-identified so participants and their statements cannot be identified or connected with them.

Benefits from your participation

Indirect benefits of participating in this focus group discussions include contributing to scientific knowledge. It will also provide you an opportunity to learn how different child nutrition directors ensured efficient and safe meal distribution.

Incentives

Incentives of amazon gift cards of $50 will be provided for participation in Focus Group discussion sessions for the full duration.

Confidentiality

1. R*esearch team members will have access to the zoom recording. We will protect confidentiality by coding and then physically separating information that identifies you from your responses (which is even safer than how medical records are stored today).*

2. Members of the Institutional Review Board (IRB) – the committee responsible for reviewing the ethics of, approving, and monitoring all research with humans – have authority to access all records. However, the IRB will request identifiers only when necessary. We will not release identifiable results of the study to anyone else without your written consent unless required by law.

Right to Withdraw

You do not have to volunteer for this study, and there is no penalty if you refuse. If you start the study and decide that you do not want to finish, just inform the researcher. Whether or not you participate or withdraw will not affect your current or future relationship with the Department of Nutrition and Hospitality Management, or with the University, and it will not cause you to lose any benefits to which you are entitled.

IRB Approval

This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). If you have any questions or concerns regarding your rights as a research participant, please contact the IRB at (662) 915-7482 or irb@olemiss.edu.

Please ask the researcher if there is anything that is not clear or if you need more information. When all your questions have been answered, then decide if you want to be in the study or not.

Statement of Consent

I have read the above information. I have been given an unsigned copy of this form. I have had an opportunity to ask questions, and I have received answers. I consent to participate in the study.

Furthermore, I also affirm that the experimenter explained the study to me and told me about the study's risks as well as my right to refuse to participate and to withdraw.

[] **I agree that I am 18 years or older**

[Type initials for signature]

Signature of Participant

[Click or tap here to enter text]

Printed Name of Participant

[MM/DD/YY]

Date of signature

Appendix E. Focus groups session script and discussion guide

Focus Group Discussion Guide

Date:

Time:

Site Location: Virtual, Zoom

Introduction: Hello, my name is Kritika Gupta, and I am a doctoral student in Nutrition at the University of Mississippi. The purpose of my research is to assess the resilience capacity (how well school meal programs were able to function and recover from the impact of the COVID-19 pandemic. Specifically, I want to understand how schools adapted to ensure efficient and safe meal distribution during the COVID -19 pandemic school closures and school re-openings. I am interested in learning about your experience and would appreciate your help. The focus group will last about 60 minutes and your participation is voluntary. Participants may choose to withdraw from the study at any time. I plan to record this session and keep them confidential in my report of the results. Do I have the permission to record? (Verbal consent) Questions

Icebreaker: While we can all agree that the pandemic was horrific, what was one positive outcome you can think that came from the pandemic?

1. As a very broad question, what changes were brought to your menu during COVID-19?

2. How did COVID-19 impact the food procurement process?

3. What changes were brought to food preparation process?

4. What changes were made to the food distribution/ provision of meals to the children and what were the challenges?

5. Can you suggest any one best practice each that needs to be followed in case some similar event happens again?

6. What piece of advice would you want to give to other school districts?

Thank you very much for your responses. We hope to use your responses to make sure our questionnaire asks the right questions and uses the right wording.

Appendix F. Survey questionnaire sent out to directors (consent form embedded)

Purpose: The purpose of this study is to explore how schools adapted during the COVID 19 pandemic and ensured they were providing nutritious and safe meals during school closures

Investigator: Kritika Gupta
Department of Nutrition and Hospitality Management
108 Lenoir Hall, University MS, 38677 kgupta3@olemiss.edu
Faculty sponsor: Dr. Georgianna Mann
Department of Nutrition and Hospitality Management
108 Lenoir Hall, University MS, 38677
grmann@olemiss.edu

Confidentiality: No identifiable information will be recorded, therefore we do not think you can be identified from this study.

Right to Withdraw: You do not have to volunteer for this study, and there is no penalty if you refuse or withdraw. If you start the study and decide that you do not want to finish, just exit out of the survey.

IRB Approval: This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). If you have any questions, concerns, or reports regarding your rights as a participant of research, please contact the IRB at (662) 915-7482 or irb@olemiss.edu.

By beginning this survey, you provide your **consent** to record this information **AND** you agree that **you are over 18 years of age**.

NOTE: You have the right to exit the survey at any point. Incentives will be provided only upon completion of the survey.

- o Yes
- o No

Skip To: End of Survey If Purpose: The purpose of this study is to explore how schools adapted during the COVID 19 pandemic... = No

Q0 Did your school district continue school meal operations during Spring 2020 OR Summer 2020 OR Fall 2020 OR Spring 2021 of the school year?

- o Yes (please check even if you resumed operations in Spring 2021)
- o No

Skip To: End of Survey If Did your school district continue school meal operations during Spring 2020 OR Summer 2020 OR Fal... = No

Q1. Your job title at school

- o Child/School nutrition director
- o Child nutrition manager/supervisor
- o Other _____

Q2. Highest degree completed

- o Undergraduate (Associates or Bachelors)
- o Graduate - Masters
- o Graduate - PhD
- o Other

Q3. Years of experience in child nutrition

- o <3 years
- o 3-5 years
- o 5-10 years
- o 10+ years

Q4. School district name _____

Q5. State in which your school district is located

- o Mississippi
- o Louisiana
- o West Virginia

The following statements reflect the possible impact of the COVID-19 pandemic on school meal program operations. Click in the school term(s) when the following incidences occurred in your operation(s). CLICK ALL THAT APPLY

Q6. Financial losses to school meal programs due to the pandemic	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q7. Reduced school meal participation	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q8. Reduced availability of food products	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q9. Reduced availability of supplies related to meal preparation and distribution (for example, packaging, storage, and related supplies	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021

Q10. Additional COVID-19 protocols and food safety practices to be established for employees to ensure serving safe food	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q11. Constant changes in guidance regarding COVID-19 related safety	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q12. School meal program staff shortages	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q13. Challenges to providing planned menus because of either staff or shortage or food supply chain shortage	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q14. Challenges to meet reimbursable meal requirements	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021

Click the school term(s) in which you may have experienced or are still experiencing encouraging outcomes. CLICK ALL THAT APPLY

Q15. The pandemic brought the importance of school meal programs to the community as a whole	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q16. The pandemic improved solidarity and teamwork among school meal program staff	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q17. School meal programs received assistance from the community in the form of donations	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q18. School meal programs received assistance from the community in the form of volunteers	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q19. The pandemic facilitated greater collaboration and support among all school staff (school nutrition, teachers, administration, sanitation staff, etc.)	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q20. The pandemic promoted creativity in menu creation and adaptation	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021

Click the school term(s) when the following types of food were distributed? CLICK ALL THAT APPLY

Q21. Entrees/sides needing further preparation at home	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q22. Shelf-stable meals not needing further preparation	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q23. RTE foods were served hot and/or cold	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q24. Bulk foods (e.g., a gallon of milk, a loaf of bread, a head of lettuce) were provided to the family	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021

Click the school term(s) where the following provision methods were used? CLICK ALL THAT APPLY

Q25. Take home meals provided for students to take home and eat on the days they were distant learning	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q26. School meals delivered to students (along bus routes or to homes)	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q27. Meals picked up in the cafeteria to eat in the classroom	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q28. Meals picked up at selected school sites (e.g., school parking lot, library, gymnasium)	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q29. Meals picked up at selected non-school sites (e.g., food bank, public library, public park)	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q30. School meals were eaten in the cafeteria	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021

Check the school term(s) where your standard storage space was NOT adequate. CLICK ALL THAT APPLY

Q31. Dry storage space	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021

Q32. Refrigerator space ☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021

Q33. Freezer space ☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021

Check the school term(s) where your standard storage space was NOT adequate and you needed to rent/buy/borrow storage space. CLICK ALL THAT APPLY

Q34. Dry storage space ☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021

Q35. Refrigerator space ☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021

Q36. Freezer space ☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021

Click the school term(s) for the meal distribution implemented in your school meal program. CLICK ALL THAT APPLY

Q37. Drive through pick up – no one leaves the vehicle ☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021

Q38. Limiting the number of days of meal pick-up service ☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021

Q39. Crowd or/line control efforts at meal pick-up sites ☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021

Q40. Staggering meal pick-up times ☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021

Q41. Limiting building access to employees only ☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021

Click the school term(s) in which safety or social distance measure were changed. CLICK ALL THAT APPLY

Q42. More frequent cleaning/sanitation	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q43. Discontinuing use of self-service stations or bars (i.e., salad/condiment bars)	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q44. Enforcing social distance where meals are consumed (e.g., spacing tables 6 feet apart)	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q45. Providing and/or requiring masks for students	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q46. Requiring students to wash hands/use hand sanitizer prior to meal service	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q47. Enforcing social distance during meal pick-up/selection	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q48. Serving pre-plated/packaged meals	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q49. Utilizing touchless payment/counting/claiming systems	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q50. Having students eat meals in the classroom	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q51. Installing physical barriers and/or sneeze-guards	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q52. Spreading out meal prep/packaging stations	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q53. Limiting the number of staff members at prep/distribution locations	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021
Q54. Rotating staff schedules/assignments to limit exposure	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021

Click the term(s) in which your school meal programs had changes in staff employment. CLICK ALL THAT APPLY. (T-temporarily/ P-permanently)

Q55. Lay off workers	☐ Spring 2020 (T/P)
	☐ Summer 2020 (T/P)
	☐ Fall 2020 (T/P)
	☐ Spring 2021 (T/P)
Q56. Furlough workers	☐ Spring 2020 (T/P)
	☐ Summer 2020 (T/P)
	☐ Fall 2020 (T/P)
	☐ Spring 2021 (T/P)
Q57. Reduce workers' hours	☐ Spring 2020 (T/P)
	☐ Summer 2020 (T/P)
	☐ Fall 2020 (T/P)
	☐ Spring 2021 (T/P)
Q58. Reduce workers' salary or wages	☐ Spring 2020 (T/P)
	☐ Summer 2020 (T/P)
	☐ Fall 2020 (T/P)
	☐ Spring 2021 (T/P)
Q59. Reduce workers' benefits	☐ Spring 2020 (T/P)
	☐ Summer 2020 (T/P)
	☐ Fall 2020 (T/P)
	☐ Spring 2021 (T/P)
Q60. Reassign workers	☐ Spring 2020 (T/P)
	☐ Summer 2020 (T/P)
	☐ Fall 2020 (T/P)
	☐ Spring 2021 (T/P)
Q61. Resigned on their own	☐ Spring 2020 (T/P)
	☐ Summer 2020 (T/P)
	☐ Fall 2020 (T/P)
	☐ Spring 2021 (T/P)

Q62. Any other information related to school meal programs (esp. during the COVID-19 pandemic) that you would like us to know. _____

Appendix G. Survey questionnaire sent out to parents/caregivers (consent form embedded)

Purpose: The purpose of this study is to learn about parents/caregivers and their children's experiences during the COVID-19 pandemic in regard to school nutrition programs.

Investigator: Kritika Gupta
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Faculty sponsor: Dr. Georgianna Mann
Department of Nutrition and Hospitality Management
108 Lenoir Hall, University MS, 38677
grmann@olemiss.edu

Confidentiality: No identifiable information will be recorded, therefore we do not think you can be identified from this study.

Right to Withdraw: You do not have to volunteer for this study, and there is no penalty if you refuse or withdraw. If you start the study and decide that you do not want to finish, just exit out of the survey.

IRB Approval: This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). If you have any questions, concerns, or reports regarding your rights as a participant of research, please contact the IRB at (662) 915-7482 or irb@olemiss.edu.

By selecting "YES" below this survey, you provide your **consent** to record this information **AND** you agree that **you are over 18 years of age**.

NOTE: You have the right to exit the survey at any point. Incentives will be provided only upon completion of the survey.

- Yes
- No

Skip To: End of Survey if No is selected

Q0 Did your child eat school meals during Spring 2020 OR Summer 2020 OR Fall 2020 OR Spring 2021 of the school year?

- o Yes (If you have more than one child, you should complete the survey for the oldest child in elementary or middle school (Grades Kindergarten to 8th)
- o No

Skip To: End of Survey if No is selected

Q1. Name of school district that your child is enrolled in _____

Q2. What describes you the best?

- o I am the child's mother (either biological or adoptive)
- o I am the child's father (either biological or adoptive)
- o I am the child's caregiver (family)
- o I am the child's caregiver (not family)
- o None of the above

Skip To: End of Survey if None of the Above is selected

Q3. State in which you are located

- o Mississippi
- o Louisiana
- o West Virginia
- o Other/none of the above

Skip To: End of Survey if None of the Above is selected

Q4. In Spring 2020 (March 2020 - May 2020), which meals did your child get from school?	☐ Breakfast ☐ Lunch ☐ After school snack ☐ My child did not receive any school meals
Q5. In Summer 2020 (June 2020 - August 2020), did your child receive any free meals from school or another site, such as a public park or library?	☐ Yes ☐ No
Q6. In Fall 2020 (September 2020 - December 2020), which meals did your child get from school?	☐ Breakfast ☐ Lunch ☐ After school snack ☐ My child did not receive any school meals

Q7. In Spring 2021 (March 2021 - May 2021), which meals did your child get from school?	☐ Breakfast ☐ Lunch ☐ After school snack ☐ My child did not receive any school meals
For the meals that your child received, how did you pay for those meals?	
Q8. Free meals	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021 ☐ I don't know or N/A
Q9. Reduced-price meals	☐ Breakfast ☐ Lunch ☐ After school snack ☐ My child did not receive any school meals
Q10. Full price meals	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021 ☐ I don't know or N/A
Click on the school terms when YOUR CHILD was impacted by the following statements. CLICK ALL THAT APPLY	
Q11. It was challenging to pick up my child's school meals because I had no transportation	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021 ☐ I don't know or N/A
Q12. My child did not participate in school meals because we received food from local churches and/or other organizations.	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021 ☐ I don't know or N/A
Q13. It was challenging to pick up my child's school meals because I was working during the pick-up times.	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021 ☐ I don't know or N/A
Q14. The school meals would run out during pick-up times.	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021 ☐ I don't know or N/A

Q15. The school meals did not have much variety in the foods they offered	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021 ☐ I don't know or N/A
Q16. There was reduced food availability through school meals programs	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021 ☐ I don't know or N/A

Click on the school terms when YOUR CHILD received the following types of meals. CLICK ALL THAT APPLY

Q17. Entrees/sides needing further preparation at home	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021 ☐ I don't know or N/A
Q18. Shelf-stable meals not needing further preparation	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021 ☐ I don't know or N/A
Q19. RTE foods were served hot and/or cold	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021 ☐ I don't know or N/A
Q20. Bulk foods (e.g., a gallon of milk, a loaf of bread, a head of lettuce) were provided to the family	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021 ☐ I don't know or N/A

Click on the school terms when YOU or YOUR CHILD used the following modes of delivery of meals. CLICK ALL THAT APPLY

Q21. Take home meals provided for students to take home and eat on the days they were distant learning	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021 ☐ I don't know or N/A
Q22. School meals delivered to students (along bus routes or to homes)	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021 ☐ I don't know or N/A

Q23. Meals picked up in the cafeteria to eat in the classroom	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021 ☐ I don't know or N/A
Q24. Meals picked up at selected school sites (e.g., school parking lot, library, gymnasium)	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021 ☐ I don't know or N/A
Q25. Meals picked up at selected non-school sites (e.g., food bank, public library, public park)	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021 ☐ I don't know or N/A
Q26. School meals were eaten in the cafeteria	☐ Spring 2020 ☐ Summer 2020 ☐ Fall 2020 ☐ Spring 2021 ☐ I don't know or N/A

Q27. With which race do **YOU** identify?

- White
- Black or African American
- American Indian or Alaska Native
- Asian
- Native Hawaiian or Pacific Islander

Q28. Which of the following best describes YOUR ethnic background?

- Hispanic or Latino
- Non-Hispanic or non-Latino

Q29. With which race does **YOUR CHILD** identify?

- White
- Black or African American
- American Indian or Alaska Native
- Asian
- Native Hawaiian or Pacific Islander

Q30. Which of the following best describes the ethnic background of **YOUR CHILD**?

- Hispanic or Latino
- Non-Hispanic or non-Latino

Your employment status (Click on your employment status as applicable during different school terms)

Q31. Spring 2020

- Employed full time
- Employed part-time
- Homemaker
- Retired
- Unemployed and looking for a job
- Unemployed and not looking for a job
- Disabled/social security
- Other/ do not wish to answer

Q32. Summer 2020

- Employed full time
- Employed part-time
- Homemaker
- Retired
- Unemployed and looking for a job
- Unemployed and not looking for a job
- Disabled/social security
- Other/ do not wish to answer

Q33. Fall 2020

- Employed full time
- Employed part-time
- Homemaker
- Retired
- Unemployed and looking for a job
- Unemployed and not looking for a job
- Disabled/social security
- Other/ do not wish to answer

Q34. Spring 2021

- Employed full time
- Employed part-time

- Homemaker
- Retired
- Unemployed and looking for a job
- Unemployed and not looking for a job
- Disabled/social security
- Other/ do not wish to answer

Appendix H. Item-wise content validity index (CVI) for Manuscript II

Items	Relevant (rating 3 or 4)	Not relevant (rating 1 or 2)	I-CVIs*	Interpretation
1	7	0	1	Excellent
2	7	0	1	Excellent
3	7	0	1	Excellent
4	6	1	0.86	Excellent
5	7	0	1	Excellent
6	7	0	1	Excellent
7	7	0	1	Excellent
8	7	0	1	Excellent
9	7	0	1	Excellent
10	7	0	1	Excellent
11	7	0	1	Excellent
12	7	0	1	Excellent
13	7	0	1	Excellent
14	7	0	1	Excellent
15	7	0	1	Excellent
16	7	0	1	Excellent
17	7	0	1	Excellent
18	7	0	1	Excellent
19	7	0	1	Excellent
20	7	0	1	Excellent
21	7	0	1	Excellent
22	7	0	1	Excellent
23	7	0	1	Excellent
24	7	0	1	Excellent
25	7	0	1	Excellent
26	7	0	1	Excellent
27	6	1	0.86	Excellent
28	7	1	1	Excellent
29	7	1	1	Excellent
30	7	1	1	Excellent
31	7	1	1	Excellent
32	5	2	0.71	Good
33	7	1	1	Excellent
34	7	1	1	Excellent
35	7	1	1	Excellent
36	7	1	1	Excellent
37	7	1	1	Excellent
38	7	1	1	Excellent
39	7	1	1	Excellent
40	7	1	1	Excellent
41	7	1	1	Excellent
42	7	1	1	Excellent
43	7	1	1	Excellent
44	7	1	1	Excellent
45	7	1	1	Excellent
46	7	1	1	Excellent
47	7	1	1	Excellent
48	7	1	1	Excellent

49	7	1	1	Excellent
50	7	1	1	Excellent
51	7	1	1	Excellent
52	7	1	1	Excellent
53	7	1	1	Excellent
54	7	1	1	Excellent
55	7	1	1	Excellent
56	7	1	1	Excellent
57	6	1	0.86	Excellent
58	6	1	0.86	Excellent
59	6	1	0.86	Excellent
60	6	1	0.86	Excellent
61	7	1	1	Excellent
62	7	1	1	Excellent

Number of experts = 7, Interpretation of I-CVIs: If the I-CVI ≥ 0.71 and I-CVI < 0.86, interpretation = good; If the CVI ≥ 0.86, interpretation = excellent

Appendix I. Item-wise content validity index (CVI) for Manuscript III

Items	Relevant (rating 3 or 4)	Not relevant (rating 1 or 2)	I-CVIs*	Interpretation
1	7	0	1	Excellent
2	7	0	1	Excellent
3	7	0	1	Excellent
4	7	0	1	Excellent
5	7	0	1	Excellent
6	7	0	1	Excellent
7	7	0	1	Excellent
8	7	0	1	Excellent
9	7	0	1	Excellent
10	7	0	1	Excellent
11	7	0	1	Excellent
12	7	0	1	Excellent
13	7	0	1	Excellent
14	7	0	1	Excellent
15	5	2	0.71	Good
16	5	2	0.71	Good
17	5	2	0.71	Good
18	5	2	0.71	Good
19	5	2	0.71	Good
20	6	1	0.86	Excellent
21	6	1	0.86	Excellent
22	6	1	0.86	Excellent
23	7	0	1	Excellent
24	5	2	0.71	Good
25	7	0	1	Excellent
26	7	0	1	Excellent
27	7	0	1	Excellent
28	7	1	1	Excellent
29	7	1	1	Excellent
30	7	1	1	Excellent
31	7	1	1	Excellent
32	7	0	1	Excellent

Number of experts = 7, Interpretation of I-CVIs: If the I-CVI ≥ 0.71 and I-CVI < 0.86, interpretation = good; If the CVI ≥ 0.86, interpretation = excellent

VITA

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Academic Preparation

The University of Mississippi, Oxford, MS
Doctor of Philosophy, April 2022; Concentration: Nutrition Policy
Phi Kappa Phi

Lovely Professional University, Phagwara, India
Master of Science, June 2019; Field of study: Nutrition and Dietetics
Gold Medalist

Punjab Agricultural University, Ludhiana, India
Bachelor of Science (with Honors), June 2017; Field of study: Nutrition and Dietetics

Professional Experience

Research & Analytics Laboratory Statistics Consultant, University of Mississippi, 2019
Graduate Research Assistant, Department of Nutrition and Hospitality Management, 2019-21
Graduate Instructor of Record, Department of Nutrition and Hospitality Management, 2021
Graduate Teaching Assistant, Department of Nutrition and Hospitality Management, 2020-21

Grants, fellowships, and funding

Funded

2022-23 **Gupta, K.,** Mann, G. & Lambert, L. Resilience capacity of the school meal programs during COVID-19: southeast US. Foodservice Systems Management Education Council. $2000. (PI)

2021-22 **Gupta, K.**, Lambert, L. & Mann, G. Resilience capacity of the school meal programs in Mississippi during the COVID-19 pandemic. Graduate Student Research Council Grants. The University of Mississippi. $1000. (PI)

2021-22 **Mann, G. Lambert, L. & Gupta, K.** Identification and exploration of racial and ethnic disparities in accessing school meals in Mississippi school districts during

COVID-19. Achieving Equity Investment Grants. The University of Mississippi. $8,309. (Co-PI)

2021 **Gupta, K.** Summer Research Assistantship. $3000.

2021 **Gupta, K.** Critical Thinking Redesign (CTR) Grant. $500

2018 **Gupta, K.** Fortification of extruded food products using fishbone powder as the natural calcium source. AcSIR-Kalam Fellowship, CSIR-Central Food Technological Research Institute, Mysore, India. INR 30,000. (PI)

Scholarships, awards, and honors

2022 SNEB Foundation Scholarship, Society for Nutrition Education and Behavior. $500.

2022 2022 Class Marshal, Doctoral Hooding Ceremony, The University of Mississippi

2022 Outstanding Graduate Student in Nutrition and Hospitality Management Award, University Convocation, University of Mississippi

2022 Diversity Innovator Award, ASB Annual Leadership & Engagement Awards, The University of Mississippi

2022 Outstanding Student Organization Officer Award, ASB Annual Leadership & Engagement Awards, The University of Mississippi

2021 Phi Kappa Phi Love of Learning Award

2021 SNEB Foundation Scholarship

2021 Center for Teaching and Learning 2021 Graduate Teaching Assistant Award

2020 Her STEM story conference scholarship

2020 Phi Kappa Phi Honors Society

Publications

Published Refereed Journal Articles

Wade, A.K., **Gupta, K.**, Holben, D.H. Exploratory Evaluation of Home-delivered Meal-kits within a rural, Southern United States Community Food System. *Journal of Hunger and Environmental Nutrition.* Accepted February 24, 2022. DOI: 10.1080/19320248.2022.2047864

Hajizadeh, H., Azar, P.S., Nadrian, H., Bejestani, F.S., Kolahi, S., & **Gupta, K.** (2021). Cognitive determinants of weight control by dietary pattern groups among postmenopausal women with osteoporosis: an application of Theory of Planned Behavior. *Health Promotion Perspectives*. 11(43): 453. DOI: 10.34172/hpp.2021.57

Gupta, K., Grove, B., & Mann, G. (2021). Impact of service-learning on personal, social, and academic development of Community Nutrition students. *Journal of Community Engagement and Scholarship.* 13(3).

Kumar, A., Kumari, P., **Gupta, K.**, & Singh, M. (2021) Food stabilizers: A comprehensive review on the sources, chemistry, and considerations for application in foods. *Food Reviews International*. DOI: 10.1080/87559129.2021.1950174

Mann, G., Kaiser, K., Trapp, N., Cafer, A., Grant, K., **Gupta, K**., & Bolden, C. Barriers, Enablers, and Possible Solutions for Student Wellness: A Qualitative Analysis of Student, Administrators, and Staff Perspectives. (2021). *Journal of School Health*. DOI: 10.1111/josh.13092

Kumar, A., Kaur, A., **Gupta, K.**, Gat, Y., & Kumar, V. (2021). Assessment of germination time of finger millet for the value addition in functional foods. *Current Science.* 120(2): 406-413.

Mann, G., Lambert, L., **Gupta, K.** & Partacz, M. (2020). Smart Snacks in College: Possibilities for university vending. *Health Promotion Perspectives*. 10(4): 393-400. DOI: 10.34172/hpp.2020.58

Kumar, A., Kaur, A., Tomer, V., **Gupta, K**. & Kaur, K. (2020). Effect of rose syrup and marigold powder on the physicochemical, phytochemical, sensorial, and storage properties of nutricereals and milk-based functional drink. *Journal of the American College of Nutrition.* 1-8. DOI: 10.1080/07315724.2020.1744487

Saini, M., **Gupta, K.**, Gat, Y., & Tomer, V. (2019). Knowledge, Attitude, and Practices (KAP) of low socio-economic status women regarding Complementary Feeding in Northern Punjab. *Journal of the Indian Dietetic Association, 42(2),* 48-62.

Gupta, K., Kumar, A., Tomer, V., Kumar, V., & Saini, M. (2019). Potential of Colocasia leaves in human nutrition: Review on nutritional and phytochemical properties. *Journal of Food Biochemistry*, e12878. DOI: 10.1111/jfbc.12878

Kumar, A., Kaur, A., Tomer, V., Rasane, P., & **Gupta, K**. (2019). Development of nutricereals and milk-based beverage: Process optimization and validation of improved nutritional properties. *Journal of Food Process Engineering*, e13025. DOI: 10.1111/jfpe.13025

Kumar, A., **Gupta, K.**, Tomer, V., Kaur, A., & Kumar, V. (2019). Bisphenols as Human Health Hazard: A Systematic Review on Potent Sources, Route of Exposure, Harmful Effects and Safe Alternatives. *Toxicology International, 25(1),* 78-92. DOI: 10.18311/ti/2018/v25i1/22303

Kumar, A., Tomer, V., Kaur, A., Kumar, V., & **Gupta, K**. (2018). Millets: a solution to agrarian and nutritional challenges. *Agriculture & Food Security, 7(1),* 31. DOI: 10.1186/s40066-018-0183-3

Book Chapter

Tomer, V., Kumar, A., **Gupta, K.**, Shukla, S., & Rafiq, S. (2020). Walnut. In: Antioxidants in Vegetables and Nuts-Properties and Health Benefits (pp. 385-422). Springer, Singapore. DOI: 10.1007/978-981-15-7470-2_20

Book reviews

Gupta, K. "Advances in Food Security and Sustainability" [New Resources for Nutrition Educators]. *Journal of Nutrition Education and Behavior*. 2021; 53(5): 449-450.

Gupta, K. "Research. Successful Approaches in Nutrition and Dietetics" [New Resources for Nutrition Educators]. *Journal of Nutrition Education and Behavior*. 2021; 53:89-90. DOI: 10.1016/j.jneb.2020.10.012

Gupta, K. "Dietary Fiber: Properties, Recovery, and Applications" [New Resources for Nutrition Educators]. *Journal of Nutrition Education and Behavior*. 2020; 52:990-991. DOI: 10.1016/j.jneb.2020.02.012

Abstracts and Presentations

Gupta, K., Mann, G., & Lambert, L. 'Silver lining': Encouraging outcomes and perceived best practices for child nutrition directors during COVID-19 pandemic. Poster: *55th Annual Conference, Society for Nutrition Education and Behavior*; 2022 August; Atlanta, GA, USA.

Gupta, K., Jo, J., Mann, G. & Lambert, L. Racial differences in the experiences of Mississippi parents/caregivers regarding school meal programs during the pandemic. Poster: *84th Annual Conference, Mississippi Public Health Association;* 2022 April; Flowood, MS, USA. 2nd position.

Gupta, K., Lambert, L. & Mann, G. Qualitative investigation to determine challenges and identify adaptive strategies for child nutrition directors during the COVID-19 pandemic in southeastern U.S. Poster: *Mississippi Academy of Nutrition and Dietetics Annual Meeting*; 2022 March; Bay St. Louis, MS, USA.

Gupta, K., Mann, G., & Lambert, L. Conceptual Model to assess the Resilience Capacity of School Meal Programs: A Systematic Review and Thematic analysis. Poster: *54th Annual Conference, Society for Nutrition Education and Behavior*; 2021 August; virtual. DOI: 10.1016/j.jneb.2021.04.435

Williams, A., **Gupta, K.,** Bastian, G.E., Desai-Shah, H., Qamar, Z., & Patten-Lopez, M. Karmically awesome pairings: A qualitative analysis of SNEB mentorship program participant feedback surveys. Poster: *54th Annual Conference, Society for Nutrition Education and Behavior*; 2021 August; virtual. DOI: 10.1016/j.jneb.2021.04.148

Mann, G., Lambert, L., **Gupta, K.**, Greer, S. Cooking self-efficacy, perceived health status, and fresh produce purchasing criteria among faculty and staff. Poster: *53rd Annual Conference, Society for Nutrition Education and Behavior*; 2020 July 18-21; virtual.

Mann, G., Lopez, A., Crosby C., O'Haver, J., & **Gupta, K.** Optimization of Multidisciplinary Educational Experience in Food Product Design. Poster: *12th Annual Conference on Higher Education Pedagogy*; 2020 February 6-7; Blacksburg, VA, USA.

Gupta, K., Mann, G., Lambert, L., Entrekin, S. Relationship between the importance placed on health by faculty and staff and their purchasing, consumption, and satisfaction with dining services. Poster: *10th GSC Annual Research Symposium*; 2020 March 24; Oxford, MS, USA. (Conference canceled due to COVID-19).

Gupta, K., Tarakanath K., Shwetha K., Prabhashankar P., Sachindra NM. Fortification of extruded food products using fishbone powder as the natural calcium source. Poster: *8th International Food Convention*; 2018 December 12-15; Mysuru, Karnataka, India.

Gupta, K., Kumar, A., & Tarakanath K. Effect of different treatment methods on micronutrient availability of *Colocasia* leaves. Poster: *Integrated Conference on Ayurveda, Agriculture, & Pharmacy Science*; 2018 October 12-14; Phagwara, Punjab, India.

Professional Service

Ad-hoc reviewer

Journal of Nutrition Education and Behavior
International Journal of Food Properties
Journal of Food Composition and Analysis
International Journal of Rheumatic Diseases
Journal of Dietary Supplements
Journal of Community Engagement and Higher Education
SAGE Open

Grant reviewer

UM Green Fund Committee, Office of Sustainability, University of Mississippi

Conference services

2022 Abstract reviewer, SNEB Annual Conference 2022
2022 Conference session organizer, *The Zoom Dissertation: Building Capacity for Research in Nutrition Education and Behavior with Technology,* SNEB Annual Conference 2022.
2021 Abstract reviewer, SNEB Annual Conference 2021
2021 Conference session organizer, *Let's Talk About Diversity and Inclusion: Uplifting Student Voices,* SNEB Annual Conference 2021.

Book reviewer

2021 Advances in Food Security and Sustainability
2021 Research: Successful Approaches in Nutrition and Dietetics
2020 Dietary Fiber: Properties, Recovery, and Applications
2020 Health Professional's Guide to Common Dietary Supplements
2020 2020-21 MS-AND Diet Manual

Internal services

2021 Member of the Chancellor's Commission on the Status of Women at the University of Mississippi
2021 University Search Committee member for the position of Registrar at the University of Mississippi
2021 University Search Committee member for the position of Associate Director for Instructional Support in the Center for Excellence in Teaching and Learning.
2021-22 Director of Academic and Professional Development, Graduate Student Council, University of Mississippi

2021-22 Chancellor's Graduate students' stipend Task Force, University of Mississippi
2021-22 Chancellor's standing committee, Artist Series, University of Mississippi
2021-22 Chancellor's standing committee, Museums, University of Mississippi
2021-22 Mentoring Working Group task force, University of Mississippi
2021-22 The Graduate Student Mental Health and Well-being Advisory Board Member
2021 Academic Success Mentor (Volunteer), Centre for Student Success and First-year experience, University of Mississippi
2021-22 Grant reviewer, UM Green Fund Committee, Office of Sustainability, University of Mississippi
2020-21 Graduate School Ambassador, University of Mississippi
2020-21 Alternate, Graduate Student Council, University of Mississippi
2019-20 Senator, Graduate Student Council, University of Mississippi

Societies
2022-23 Member, SNEB Board of Directors
2021-22 Chair, Student Division, Society for Nutrition Education and Behavior, USA
2020-21 Chair-Elect, Student Division, Society for Nutrition Education and Behavior, USA
2020-21 Co-Organizer, ComSciCon-Atlanta

Other
2022 Judge, Region VII Mississippi Science and Engineering Fair (MSEF) Upper Fair and Lower Fair

Talks and Guest Lectures
Peer reviewed
2021 TEDx talk at the University of Mississippi
2020 Soapbox Science Philadelphia 2020

Invited
2022 Panelist, *Building a strong mentoring culture at the University of Mississippi*, University of Mississippi, USA
2022 Guest Speaker, *COVID-19 pandemic and Global Food Insecurity*. Class of NHM 417 Community Nutrition, Department of Nutrition and Hospitality Management, University of Mississippi, USA
2022 Speaker, *Focus group research and analysis training,* Department of Nutrition and Hospitality Management, University of Mississippi, USA
2021 Guest Speaker, *COVID-19 pandemic and Global Food Insecurity*. Class of NHM 417 Community Nutrition, Department of Nutrition and Hospitality Management, University of Mississippi, USA
2021 Speaker, *Food Justice*, Annual Forum Series, Mississippi University for Women, USA
2021 Guest Speaker, Graduate student orientation, Department of Nutrition and Hospitality Management, University of Mississippi, USA
2021 Speaker, *Navigating Ph.D. positions in foreign universities, setting up a CV, and the right way to LinkedIn,* Punjab Agricultural University, Ludhiana, India
2021 Panelist, Stronger Together Dialogue Series: *Lived Experiences of Asian Americans*, University of Mississippi, USA

2021 Guest Speaker, *Qualitative Research: Focus Group Discussions*. Class of NHM 701 Graduate Seminar, Department of Nutrition and Hospitality Management, University of Mississippi, USA

2021 Guest Speaker, *Careers in Nutrition*. Class of NHM 114 Introduction to Nutrition Professions, Department of Nutrition and Hospitality Management, University of Mississippi, USA

2021 Guest Speaker, *School Food and the COVID-19 pandemic*. Class of NHM 417 Community Nutrition, Department of Nutrition and Hospitality Management, University of Mississippi, USA

2020 Guest Speaker, *World Food Day*, Punjab Agricultural University, Ludhiana, India, virtual.

2020 Guest Speaker, Graduate student orientation, Department of Nutrition and Hospitality Management, University of Mississippi, USA

2017 Guest Speaker, *Zero Hunger*, World Food Day, Lovely Professional University, Phagwara, India

2016 Guest Lecture, *Healthy eating habits, and lifestyle modifications*, Vishal's Fitness Club, Gurdaspur, India

2016 Guest Lecture, *Sports and Nutrition*, Government Senior Secondary School (Boys), Kapurthala, India

2016 Guest Speaker, *Rainwater Harvesting*, 102.7 FM Rainbow

2015 Guest Lecture, *World Anti-obesity Day*, BVM Senior Secondary School, Ludhiana, India

2015 Guest Speaker, *International Day of Rural Women*, Youth Forum, 102.7 FM Rainbow, India

2015 Guest Speaker, *World Earth Day*, All India Radio, India